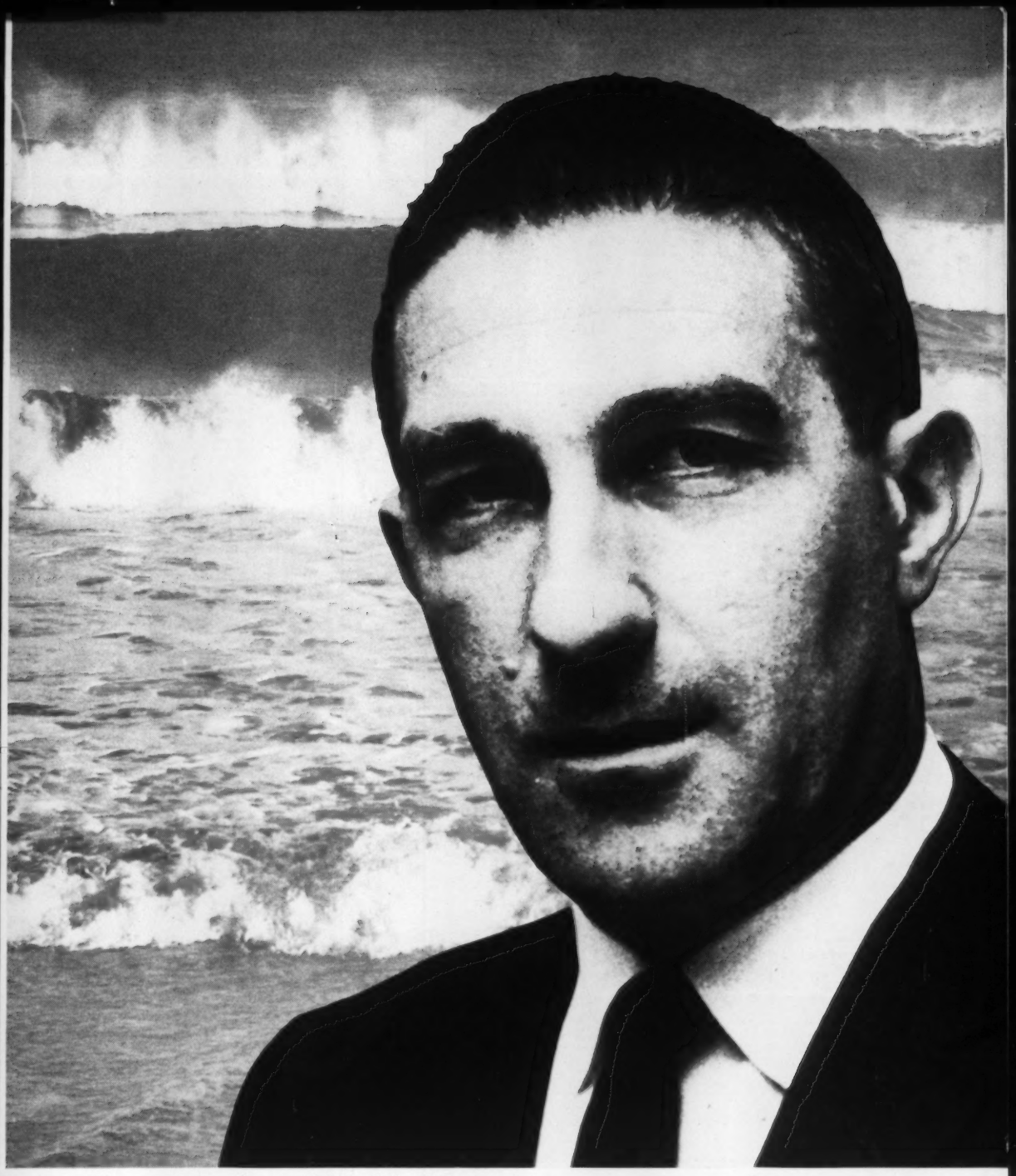
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
AUGUST 7, 1961



Interior Secretary Udall plays key role in birth of giant market . . .

SWEET WATER FROM SALTY SEAS 41

What to Expect in Auto Labor Pact 31

How to Get Better Powdered Metals . . 66

Metal Buyers Oppose Stock Buildup . . . 98

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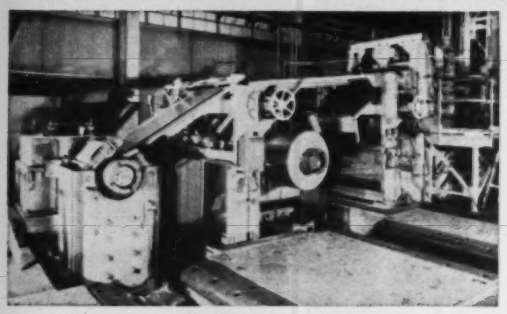
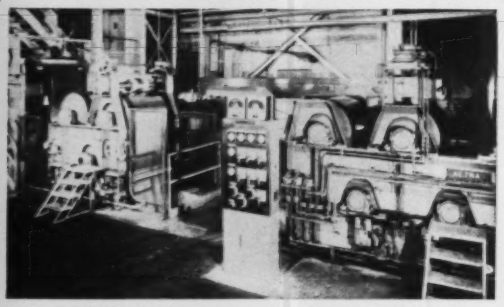
Continuous Annealing and Surface Treatment Lines have a lot in common

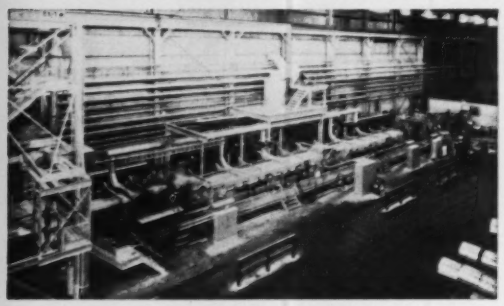


Delivery end shows recoiling.

Entry Section with uncoiling and scrap handling.



Multiple Bridle Rolls help maintain constant tension.



Strip Cleaning (horizontal) includes scrubbers and cleaning tanks

BLAW-KNOX

Aetna-Standard Division

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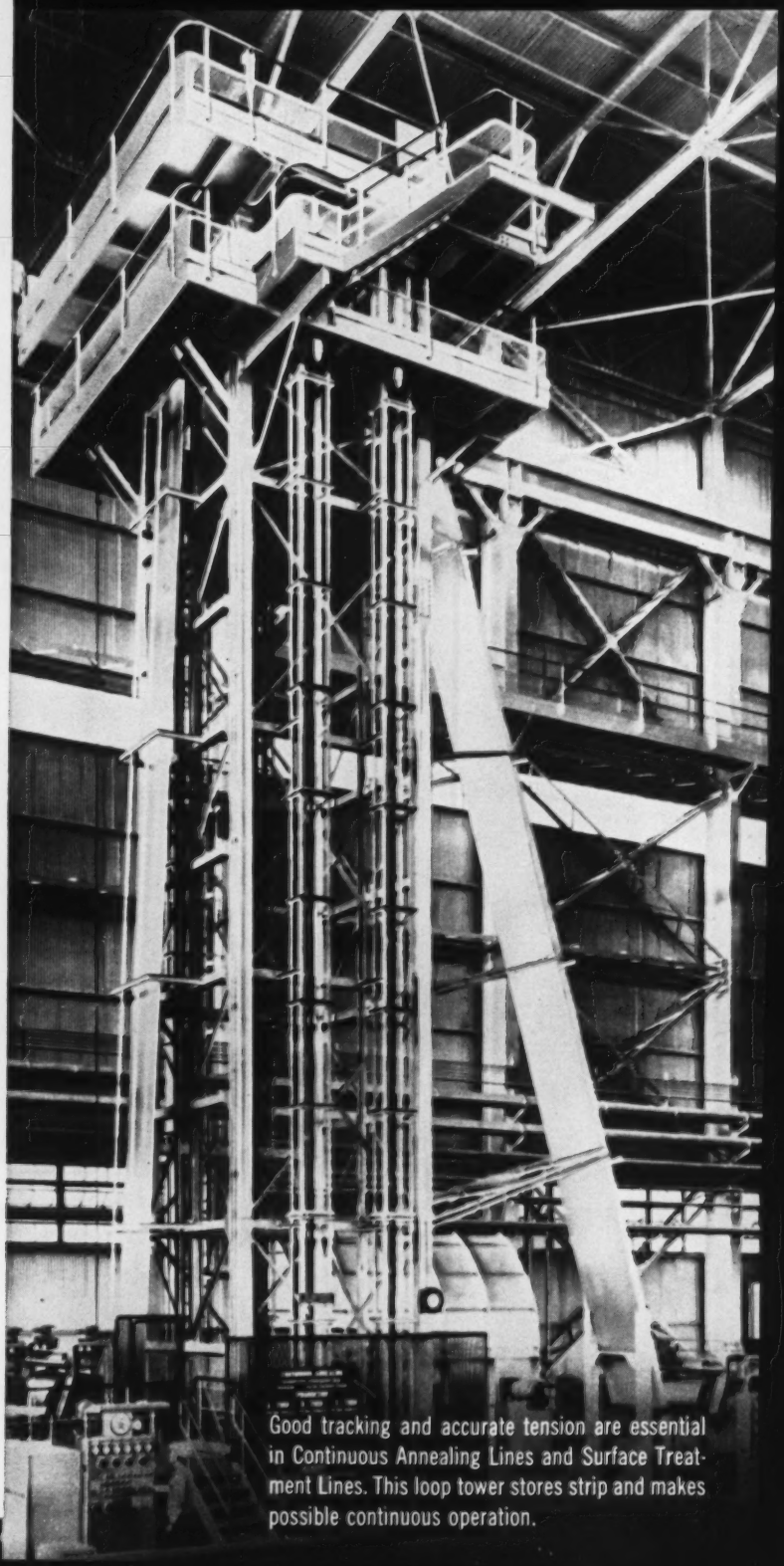
300 Sixth Avenue, Pittsburgh 22, Pennsylvania

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves



Good tracking and accurate tension are essential in Continuous Annealing Lines and Surface Treatment Lines. This loop tower stores strip and makes possible continuous operation.

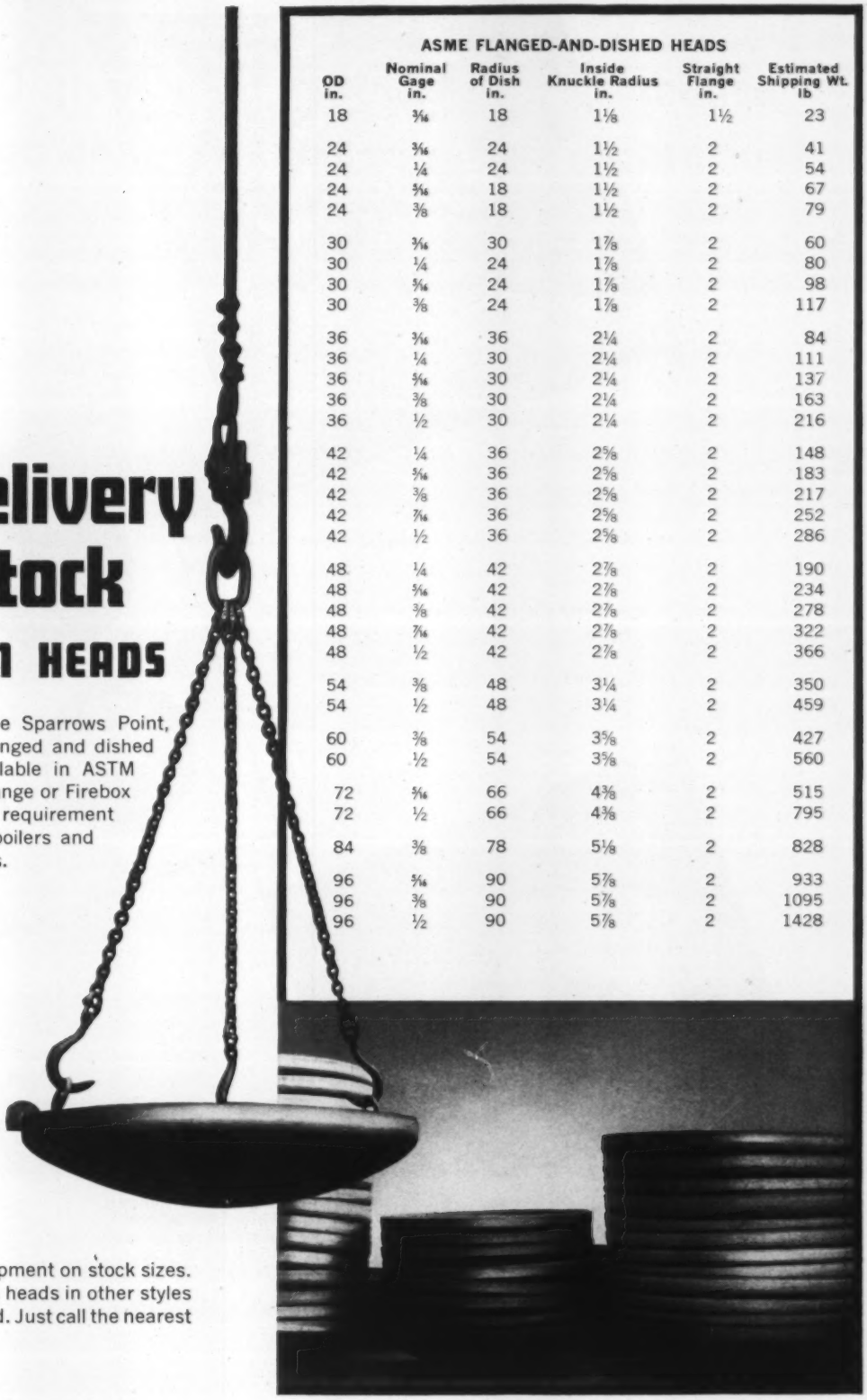
Fast delivery from stock

BETHLEHEM HEADS

Bethlehem stocks at the Sparrows Point, Md., Plant, all of the flanged and dished heads listed here. Available in ASTM Spec. A-285, Grade C Flange or Firebox steel, they meet every requirement of the ASME Code for boilers and unfired pressure vessels.

ASME FLANGED-AND-DISHED HEADS

OD in.	Nominal Gage in.	Radius of Dish in.	Inside Knuckle Radius in.	Straight Flange in.	Estimated Shipping Wt. lb
18	3/16	18	1 1/8	1 1/2	23
24	3/16	24	1 1/2	2	41
24	1/4	24	1 1/2	2	54
24	5/16	18	1 1/2	2	67
24	3/8	18	1 1/2	2	79
30	3/16	30	1 7/8	2	60
30	1/4	24	1 7/8	2	80
30	5/16	24	1 7/8	2	98
30	3/8	24	1 7/8	2	117
36	3/16	36	2 1/4	2	84
36	1/4	30	2 1/4	2	111
36	5/16	30	2 1/4	2	137
36	3/8	30	2 1/4	2	163
36	1/2	30	2 1/4	2	216
42	1/4	36	2 5/8	2	148
42	5/16	36	2 5/8	2	183
42	3/8	36	2 5/8	2	217
42	7/16	36	2 5/8	2	252
42	1/2	36	2 5/8	2	286
48	1/4	42	2 7/8	2	190
48	5/16	42	2 7/8	2	234
48	3/8	42	2 7/8	2	278
48	7/16	42	2 7/8	2	322
48	1/2	42	2 7/8	2	366
54	3/8	48	3 1/4	2	350
54	1/2	48	3 1/4	2	459
60	3/8	54	3 5/8	2	427
60	1/2	54	3 5/8	2	560
72	5/16	66	4 3/8	2	515
72	1/2	66	4 3/8	2	795
84	3/8	78	5 1/8	2	828
96	5/16	90	5 7/8	2	933
96	3/8	90	5 7/8	2	1095
96	1/2	90	5 7/8	2	1428



Steel

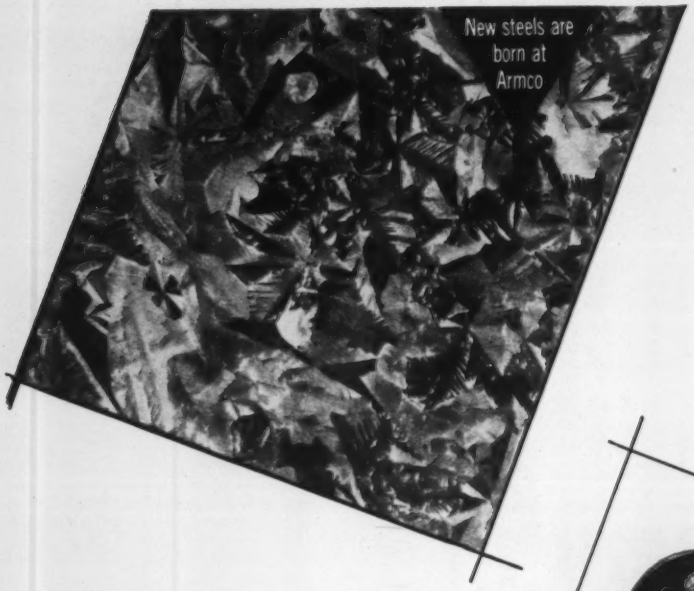
for Strength
. . . Economy
. . . Versatility

We can make prompt shipment on stock sizes. And we'd like to quote on heads in other styles and sizes than those listed. Just call the nearest Bethlehem sales office.

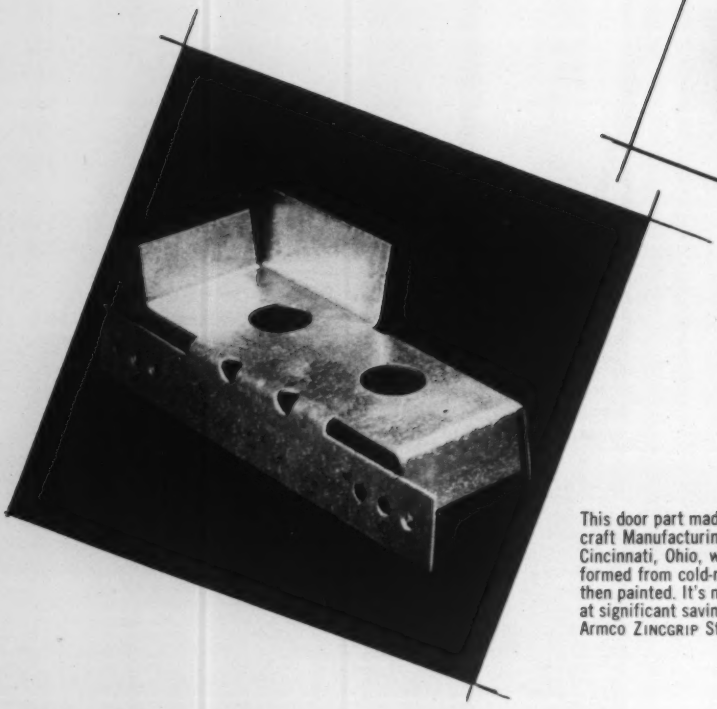
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Coating on



This door part made by Steelcraft Manufacturing Company, Cincinnati, Ohio, was previously formed from cold-rolled steel, then painted. It's now fabricated, at significant savings, from Armco ZINCGRIP Steel.

ZINCGRIP gives products durable protection at average cost of about 2⅓¢ per square foot

Can you match this with painting or plating?

Unseen structural parts are often protected from corrosion by painting or plating cold-rolled or hot-rolled steel. Yet with Armco ZINCGRIP® Steel, you can give your products the durable protection of a full-weight two-side coating of zinc at an *average cost of about 2⅓ cents per square foot.* Important cost savings are realized daily by manufacturers who take advantage of this economical protection.

Severe fabrication is no obstacle. You can work mill-coated ZINCGRIP to the limit of its ductile steel base. The tight zinc coating will not flake or peel.

If you paint or plate for protection from corrosion, it will pay you to investigate Armco ZINCGRIP Steel. Let us help you compare your costs for a painted or plated steel part with costs for the same part made from durable ZINCGRIP. Just fill in and mail the coupon.

Armco Division • Armco Steel Corporation
1171 Curtis Street, Middletown, Ohio
So that I can check savings with Armco ZINCGRIP—
☐ Send me your Application Data Bulletin
☐ Have an Armco Representative call

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

Steel

Use this label to identify your products made of strong, durable steel.

Check these cost comparisons

Steel Thickness	Cost of* ZINCGRIP Coating c/sq. ft. of sheet	Typical** Cost of Painting c/sq. ft. of sheet	Savings with ZINCGRIP c/sq. ft.
.025	1.83c	3.25c	1.42c
.050	2.72	3.25	.53
.075	2.51	3.25	.74
Average . . .	**2.35c**	**3.25c**	**.90c**

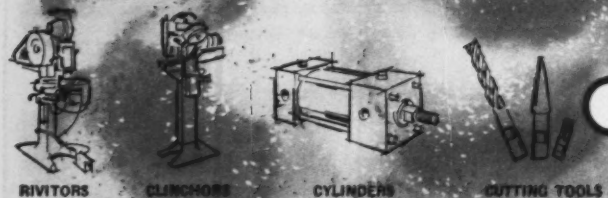
*Coated both sides **Painted both sides

Computations based on coils 24" to 36" wide. ZINCGRIP coating costs are additional costs beyond price of cold-rolled steel. Due to variations between thicknesses, cost of zinc coating in table varies somewhat even though it's the same full-weight coating. Paint costs are figured on typical dip-painting or flow-coating methods and include cost of metal preparation, paint, labor and overhead of painting operations. Some paint costs are lower than these; many are more.

ARMCO **Armco Division**

BIG NEWS

The T-J Spacemaker cylinder line is not now, nor ever has been, a probe into outer space. It is offered as a practically designed, research engineered and time tested product. Its Spacemaker feature (no tie-rods) and rugged construction gives greater strength, saves space and reduces costs in all power drive applications. The Spacemaker is available in a complete range of bore sizes and strokes, air or hydraulic, and contains many *plus features* and extras as STANDARD . . . NO EXTRA COST! Write Tomkins-Johnson, 2425 W. Michigan Ave., Jackson, Mich. for Bulletin #155-4 and for full particulars, today.



T-J TOMKINS-JOHNSON
JACKSON MICHIGAN

Giant Tale

Secretary of Interior Stewart L. Udall, right, is telling Associate Editor George Howick that the "nation faces water problems . . . that could conceivably restrict economic growth." To learn about America's giant progress in salt water conversion, see Page 41.

Besides writing articles on water conversion and many other subjects, George also authors the Metalworking Week section (Page 17) and contributes to the Program for Management Series. He joined STEEL in 1957, after attending Bowling Green State University (Ohio).

Contact

The adding machines are quiet now. They have finished their job, so we can report:

In the first half of 1961, our 33 editors and 13 correspondents traveled 250,000 miles on STEEL's editorial business.

They made 23,000 contacts (with about 15,000 people) via 10,850 letters, 9100 phone calls, and 3050 personal visits.

Of course, those figures don't include the weekly meetings STEEL editors hope they're having with all 207,000 of you through the editorial pages.

Incidental Intelligence

Geraldine, our cleaning woman and night editor, passes on these gleanings from the editors' waste baskets:

Item: National Eye Research Foundation says 500,000 American women are wearing contact lenses to change the color of their eyes. Forty per cent are shifting to blue.

Item: Molehill, W. Va., has changed its name to Mountain.

Item: There are only three major types of whiskey, each produced only in the country of its origin—American Bourbon, Scotch, and Canadian. Although little bourbon is exported, it outsells all other types combined because of the immensity of the U. S. market. Scotch outsells all others combined in the global market; its exports are 3 times its domestic sales. Canadian has two large markets—Canada and the U. S.

Item: A book publisher received an order from a prison's library for "Climbing the Executive Ladder" and "Fun on Wheels."

Item: These communities are in Florida—Romeo, Juliet, Hen Scratch, Two Eggs, Picnic, and Sopchoppy.

Sardonic Mottos

Here are some more that may be new to you:

"A man owes it to himself to become a success —once successful, he owes it to internal revenue."—submitted by John Grissom, Welex Div., Houston, Halliburton Co.

"Before you ask, the answer is no."—submitted by Arthur Schoeni of Chance Vought Corp., Dallas.

Answer

Last week we asked what IITYWYBMAD stood for. So many have replied correctly that space limitations make it impossible to list you all.

The answer: If I Tell You, Will You Buy Me A Drink?

Meet with Success

Is that meeting necessary? Associate Editor Reed Trask explores the question on Page 34. Only 10 per cent of industry's meetings are particularly effective. He gives tips on how to improve the percentage.

A graduate of Ohio State University, Reed has several years' experience writing labor, finance, and technical articles for the Cleveland *Plain Dealer* and the Cleveland Electric Illuminating Co. He has been with us since June, 1960, now operating out of New York City to cover that metropolitan area, plus eastern Pennsylvania.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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Cool Comfort for men who work in Hot Places

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Your men can work better, faster and longer when air is re-circulated and cooled by these ruggedly built portable giant fans.

Write today for complete information

B. F. PERKINS & SONS, INC.
HOLYOKE • MASS.

You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!*

Fight cancer with a checkup—and a check to the **American Cancer Society.**

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The Metalworking Weekly

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Fluid Power NEWS

OILGEAR 40 Years of Fluid Power

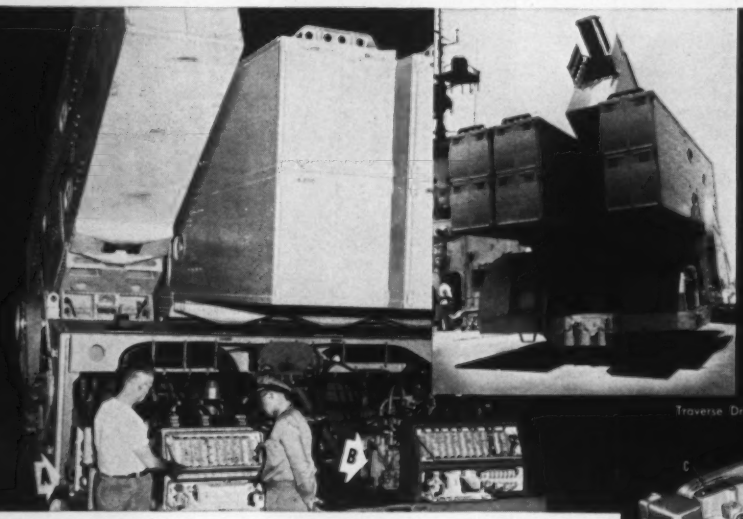
Report No. 11,400 From Oilgear *Application-Engineering* Files

HOW OILGEAR ELECTROHYDRAULIC SERVO-VALVE-CONTROLLED DRIVES AIM ASROC* MISSILE LAUNCHERS IN RESPONSE TO LOW-POWER SIGNALS FROM SHIPBOARD DIGITAL COMPUTERS.

**ASROC (Anti-Submarine ROCket) — the Navy's deadliest, integrated, anti-submarine weapons system — consists of 4 major parts: an underwater sonar detection device; an electronic, digital, firecontrol (aiming) computer; a "pepper-box" type, 8-missile launcher; and ASROC missiles. Within seconds after sonar detection of a hostile submarine, the computer charts its course, speed, and range — correlated with the ASROC-equipped ship's course, speed, and roll. The resultant computer signals command the launcher to traverse and elevate instantly to accurate "aim" position, and continue to "track" from subsequent computer command signals. The ship commander merely pushes a button to fire either rocket-propelled, homing torpedos or depth charges.*

PROBLEM: Power and control for both the traverse and elevation drive systems to "aim" ASROC missile launchers in response to direct, low-power, electrical command signals from a digital firecontrol computer.

REQUIREMENTS: 1. High traverse and elevation speeds in either direction, with shockless reversal, to bring launcher "on target" — rapidly. 2. Fast, accurate control response for high-speed "homing." 3. Precisely controlled, low variable speeds for "tracking." 4. Entire drive and control systems to occupy a minimum of space within the launcher base. 5. Dependability — "no time-out permitted" — a rigid requirement for fleet use. 6. Unitized assemblies preferred, to facilitate installation and replacement.

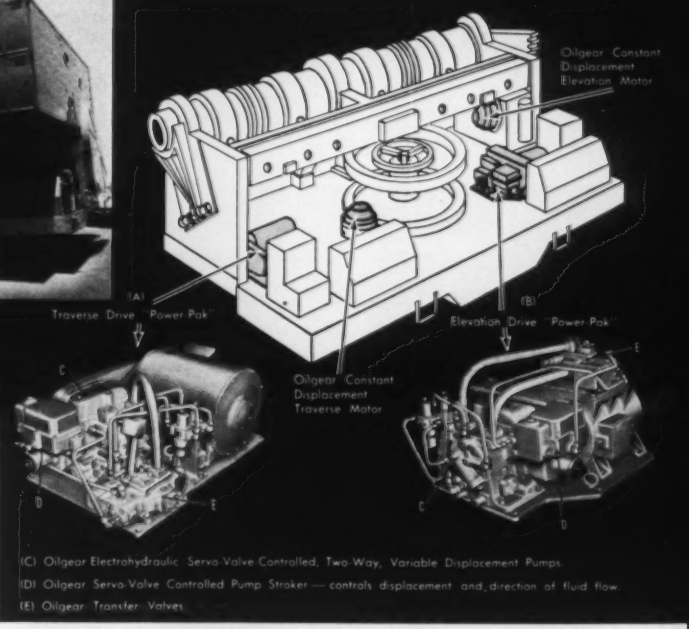


Official Photos — U.S. Navy. Actual launcher performance data is classified information.

ABOVE: ASROC missile launcher being checked at U.S. Naval Ordnance Plant, York, Pennsylvania. Arrows indicate traverse (A) and elevation (B) Power-Paks. **INSET:** ASROC launcher ready to fire aboard U.S.S. Norfolk. Each of the 8 cells serve as missile stowage magazines and launchers — all traverse as a unit . . . each over/under pair of cells elevate individually. 360° launcher traverse is possible, but a quadrant is blocked to protect ship's superstructure. Missiles weigh about 1,000 lbs., are about 15 ft long. Launcher base sketch, right, approximates position of Oilgear Drives.

SOLUTION: With Oilgear's experience in meeting the speed, control, and precise turret and gun performance requirements for U.S. Army tanks, howitzers, and anti-aircraft guns — this missile launcher application was a "natural" for Oilgear *ANY-SPEED* Drives — and the alert, accurate response of Oilgear's Electrohydraulic Servo-Valve-Controlled, Two-Way, Variable Displacement Pumps. Amplified signals up to 5-watts actuate drive controls. Cushioned, full-speed drive reversal. These small, rugged, Oilgear *ANY-SPEED* Pump and Motor Drives easily convert output from constant speed electric motors into the exact, required traverse and elevation speeds, direction, and torque . . . even under high overload conditions. An automatic feedback control compensates for load, voltage, or viscosity changes to accurately maintain computer-selected speeds. Torque transmitted automatically increases or decreases to a point just sufficient to overcome resistance. There's no "wire-drawing," or bypassing of fluid to generate heat or waste power. Both systems are totally enclosed, automatically protected against overload, pressure and flood lubricated to assure long, dependable, maintenance-free, service life.

OILGEAR *Application-Engineered* Servo-Controlled Drive Systems for Missile Launchers



(C) Oilgear Electrohydraulic Servo-Valve-Controlled, Two-Way, Variable Displacement Pumps.
(D) Oilgear Servo-Valve Controlled Pump Stroker — controls displacement and direction of fluid flow.
(E) Oilgear Transfer Valves.

Oilgear engineering and equipment has solved innumerable "problem drives." Users of Oilgear *ANY-SPEED* Drive and Control Systems in the paper, marine, food, chemical, pharmaceutical, primary metals, metalworking, textile, rubber, and other industries — as well as the military . . . agree that — *"for the lowest-cost-per-year . . . it's OILGEAR!*

For practical solutions to YOUR rotary or linear drive and control problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

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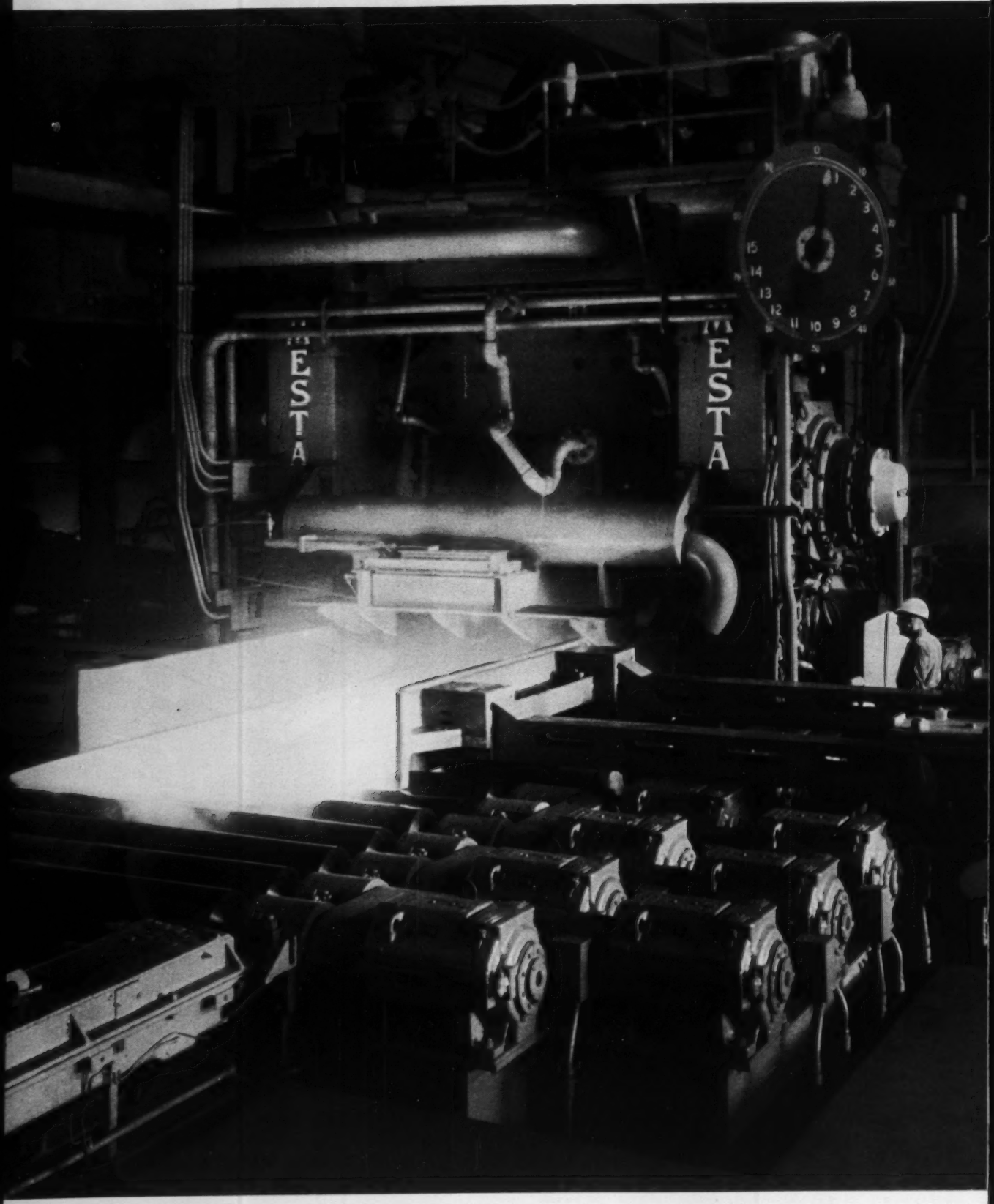
ESTA
ESTA

Computer Controls make it

"AOK" AND "GO" ALL THE WAY at Gadsden

Just as with Project MERCURY, computers now help to assure top performance of the new, giant 134″ plate rolling mill of Republic Steel, Gadsden, Alabama.

From the time a hot slab of steel approaches the mill, until it emerges as plate, electronic computers are in charge, to produce plate sizes within new, remarkably exact limits. Only the console controller can cancel or alter the "flight" of material through the rolls. "Briefing" of the mill, via punch-cards, plots the course of material through a series of reducing and descaling stages—predetermining and governing each move.

The second phase of this major breakthrough will be accomplished with the installation of a new, programmed plate gage control—believed to be the first of its kind in steelmaking history. Called the PRESSDUCTOR, the new gage control utilizes a magnetic sensor located under the last roll to report back electronically to the computer whenever there is deviation. Corrections will be automatic, instantaneous.

Phase three will be the addition of even more sensitive front and back X-ray inspection devices to measure plate thickness. Here, too, signals will be transmitted electronically to the computer—assuring continuous, automatic accuracy.

These are examples of space age technology applied to make Republic plate production "AOK" and "GO" all the way . . . examples of greatest possible significance to Republic Steel users, in terms of quality and service.

GADSDEN PLATES

are produced to the following limits:

Sheared Plates . . . . . up to 92″ wide, and up to ⅝″ thick
Torch-Cut Plates . . . . . up to 84″ wide, and up to 2″ thick
Universal Mill Plates . . . up to 48″ wide, and up to 2″ thick

Steel
Strong
Modern
Dependable

REPUBLIC STEEL

DEPT. ST-2546 • 1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

REPUBLIC HAS THE FEEL FOR MODERN STEEL

666. Jomac work glove. Reversible—any two make a pair. Men's knitwrist.

It's GLOVEMANSHIP that makes JOMACS

your best buy in industrial work gloves

GLOVEMANSHIP is an art. It involves combining the ideal yarns, processing the cloth by techniques which will impart the wearing and protective qualities desired, creating patterns, styling cuffs and, finally, producing the finished gloves with real craftsmanship. Jomac practices GLOVEMANSHIP.

What does GLOVEMANSHIP mean to you? It means lower glove costs with quality gloves that afford maximum dexterity, more comfort; that resists oils, greases and stains; that protect hands and forearms against such hazards as cuts, burns, bruises and abrasions; that can be washed time after time.

For better fit, greater dexterity, more comfort, longer wear, and maximum safety in handling most chemicals, oils, greases, etc. — specify North PVC Coated Gloves.

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In Canada: James North Canada Company, Ltd., Simcoe, Ont.

"Jomac Sells Quality . . . and Quality Sells Jomac!"

CALENDAR OF MEETINGS

Aug. 16-19, Society of Automotive Engineers: National meeting, West Coast Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-15, Instrument Society of America: Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 14-16, Packaging Machinery Manufacturers Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn. Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

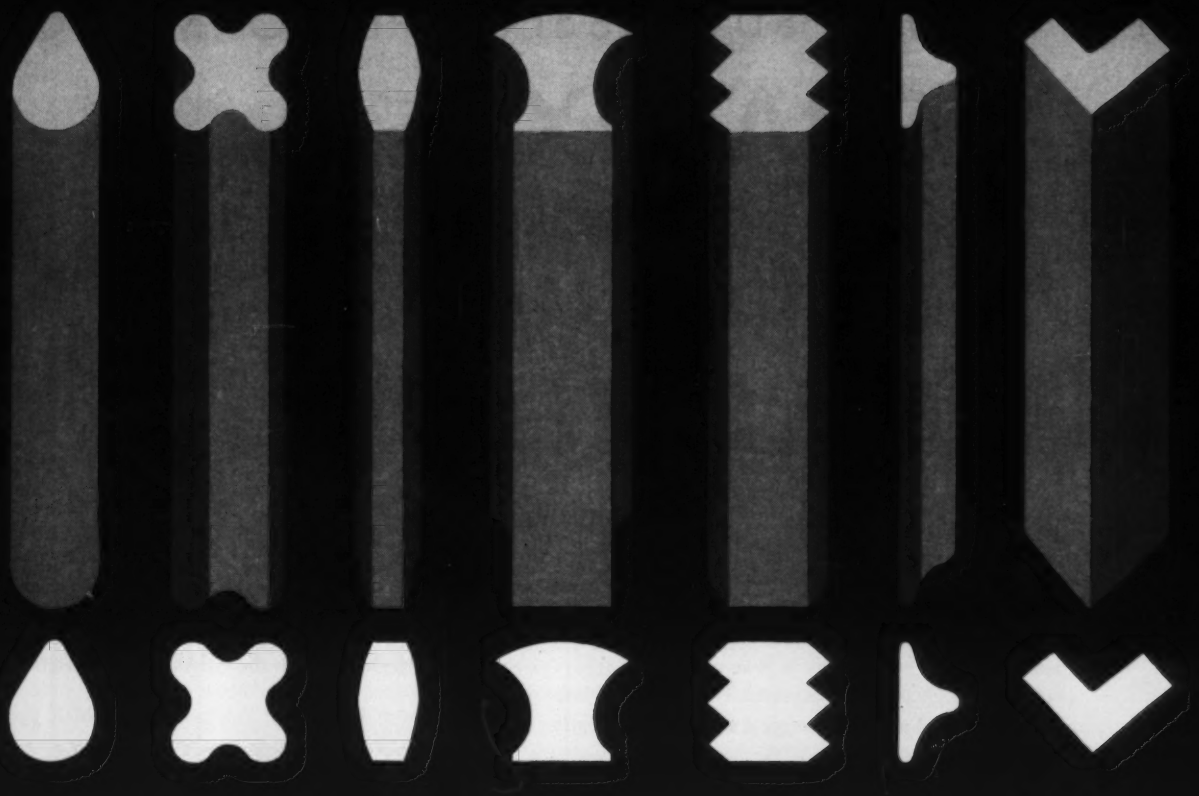
Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

Sept. 25-28, American Welding Society: Fall meeting, Adolphus Hotel, Dallas. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh: Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.



Some typical Page pre-shaped wires, enlarged for clarity.

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PAGE *pre-shaped* wire simplifies product design, reduces material costs. It requires no machining, no forming, no forging. It's delivered to you in *any* shape you require—from the simplest standards to complex "specials" made from your own drawings. You can specify low carbon, high carbon, alloy or stainless steels, or ARMCO ingot iron. The PAGE mill is America's leading special-purpose wire producer, so your specifications regarding physical properties and size tolerances are no problem. What's more, you can order your PAGE *pre-shaped* wire shipped with the kind of packaging you want. Most important, you can *always* count on PAGE uniformity.

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Write us at Monessen, Pa. for Booklet **DH-1226** on PAGE *pre-shaped* wire, or for information on what PAGE has to offer to meet your other wire requirements

PAGE

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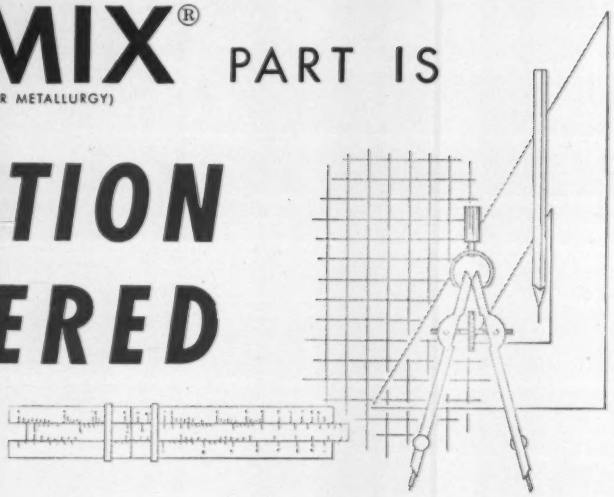
TO INSURE SUCCESSFUL PERFORMANCE

EVERY GRAMIX® PART IS

(PRODUCTS OF POWDER METALLURGY)

APPLICATION ENGINEERED

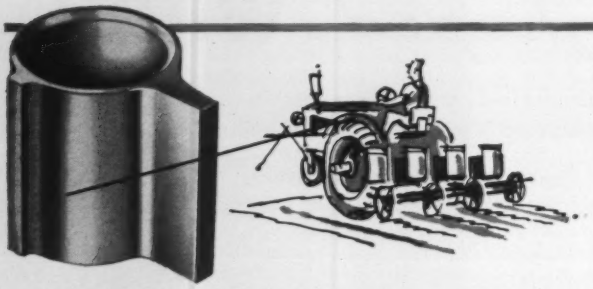


One of the most important factors to consider when purchasing powder metal parts is that of successful part performance; for a part to successfully perform its job, all of its physical and metallurgical characteristics must be suited to the application.

GRAMIX Products of Powder Metallurgy are always *Application Engineered,* which means product is specially matched to each specific application. From an almost unlimited variety of metal mixtures, one alloy is blended that contains the required properties and characteristics of the finished part; *all* aspects of part design and conditions under which it must operate are taken into account. Only then is the GRAMIX part produced.

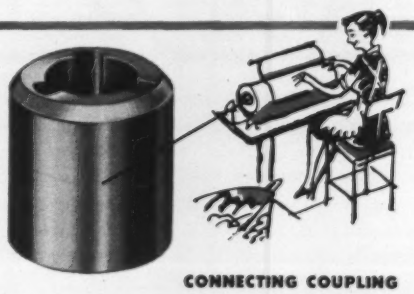
Eight of these *Application Engineered* GRAMIX parts are shown here. Each precisely suits the requirements of its job . . . each is the best part available for the job.

When you specify a GRAMIX part, you can always be sure that it has been *Application Engineered* for successful performance, long life and complete reliability. For more information on *Application Engineered* GRAMIX parts, write for Engineering Handbook G-55.



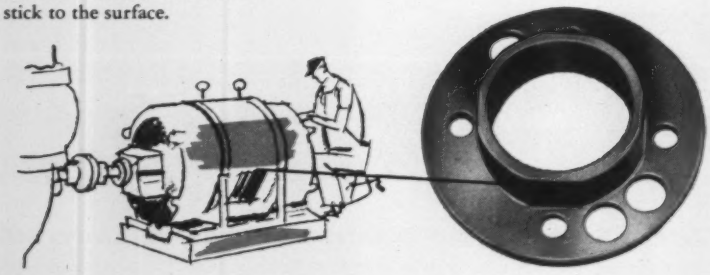
CORN SEEDER

GRAMIX was the material specified for this corn seeder part because the surface finish obtainable with the alloy used reduced the tendency of material to stick to the surface.



CONNECTING COUPLING

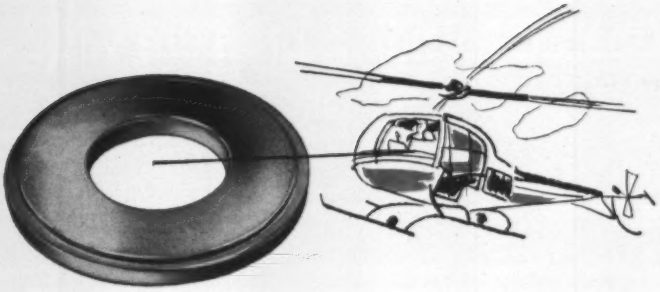
The connecting coupling employed in a small home ironer is formed from a special GRAMIX hardened steel alloy; it offers low wear and shock resistance.



CONTAINER COVER END CAP

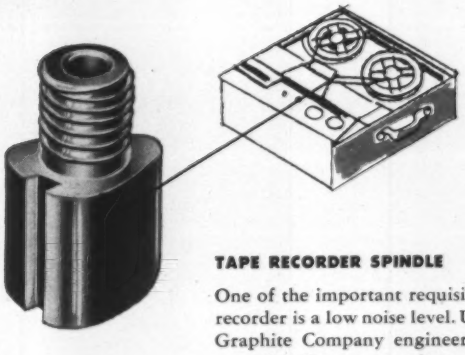
Great savings were realized when retainer caps for certain types of electric motors were made of GRAMIX.

This process made it simple and economical to mold the multiple holes to precise tolerances without extra operations.



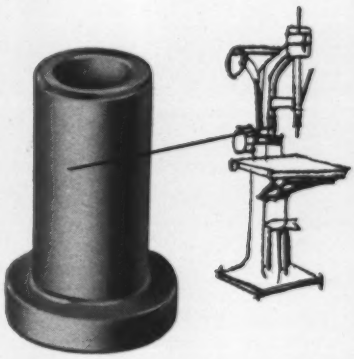
HELICOPTER THRUST WASHER

The outstanding features of the GRAMIX alloy specified for this thrust washer are a dependable and consistent friction and wear pattern as well as a fine surface finish.



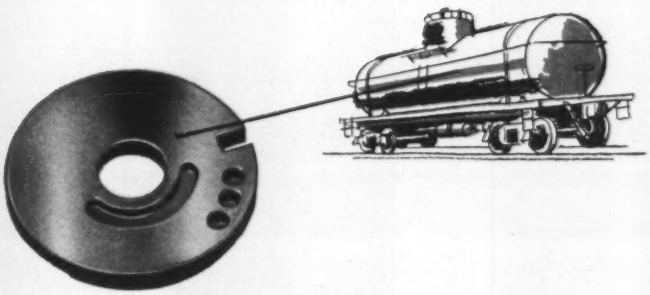
TAPE RECORDER SPINDLE

One of the important requisites in a tape recorder is a low noise level. United States Graphite Company engineers developed a special alloy to meet these requirements in the GRAMIX spindle.



GUIDE BEARING

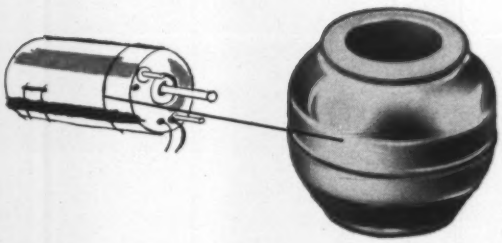
Built-in lubrication and low friction to reduce heat are important features of the GRAMIX alloy chosen for this guide bearing.



LIQUID PUMP END PLATE

This end plate is typical of many parts employed in liquid pumps of many types.

It is made from a wear resistant bronze alloy that was developed for pump applications.



FRACTIONAL H.P. MOTOR

The GRAMIX bearing for this Fractional h.p. motor was developed from a special low noise level alloy.

Its self-lubricating properties were also an important consideration in specifying GRAMIX.

METAL POWDER mpi INDUSTRIES FEDERATION

X-296-2

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 18, MICHIGAN

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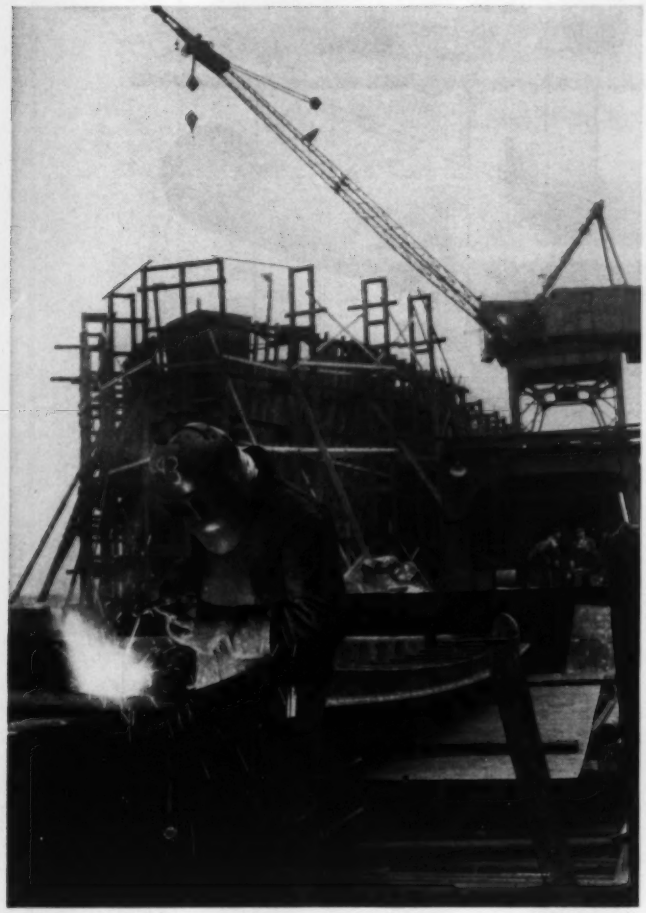
Solve any manual welding problem with ▸▸▸
. . . welders that have the greatest operator appeal—Lincoln **Idealarcs.** Men work better with these machines simply because they like them better.

...LINCOLN IDEALARC WELDERS

TM, R3M and TIG are the designations for the families of Lincoln heavy-duty Idealarc welders. R3M uses DC electrodes only; the TM, both AC and DC electrodes; and the TIG, either type electrode plus the inert gas process. One or more of these machines will handle every conceivable manual welding task, and, at the same time, permit your operations to stay flexible to meet future market conditions or accommodate newly developed electrodes. And do it profitably!



Shipyard work has flat fabrication where high-speed AC electrodes are best—and vertical and overhead welding when DC is preferred. *Idealarc TM's* are available in two models—straight AC, and AC/DC. The latter was used here since with it, you can change from one current to the other just by flipping a switch . . . that fast. This kind of flexibility lets you stay competitive as demand for high speeds and top electrode performance increases.

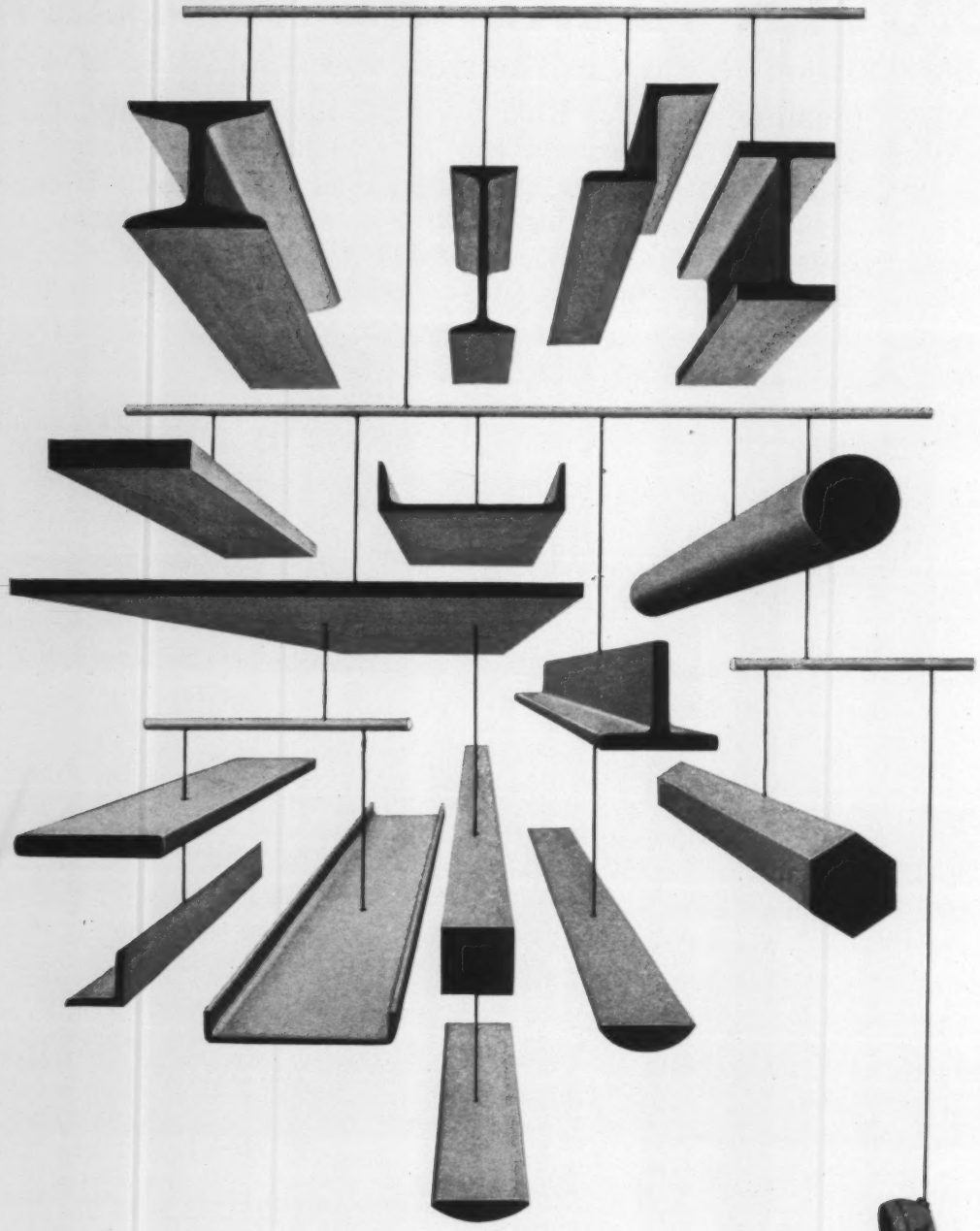
While stick welding makes up the bulk of most shop work, there is a growing use of stainless steels, aluminum, magnesium and other non-ferrous metals which are welded with an inert gas shield. Lincoln's *Idealarc TIG* welder provides both AC and DC currents plus high frequency, gas and water controls for the Tungsten Inert Gas process. It is the most complete, most versatile machine made for manual welding, and thus is ideal for large job shops.

Structural and heavy equipment fabricators feel that low machine cost plus reliability are the keys to profits on long-run, repetitive production work such as this. *Idealarc TM's* were chosen here since they are the lowest cost, straight AC welder made. And they have proved dependable through years of hard service. Get facts about Idealarcs from your Lincoln field engineer . . . a specialist in welding. Or write for bulletins which describe each machine in detail.

THE LINCOLN ELECTRIC COMPANY • DEPT. 2951 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES



Call any one of 20 Ryerson service centers for bars, shapes, structurals and plates. No one comes close to equaling Ryerson stocks of hot rolled carbon steels in shapes, sizes and tons. And no one equals Ryerson quality controls and cutting accuracy. So be Metalogical—call Ryerson.

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METALOGICS PLUS VALUES IN STEEL • ALUMINUM • PLASTICS • MACHINERY

Homer Sees Business Improving

Arthur B. Homer, chairman, Bethlehem Steel Corp., looks for a moderate improvement in business, but no splurge. He expects 1961 ingot output to be around 100 million tons. He looks for the third quarter to be better than the second and the fourth better than the third. He foresees a "moderate" build-up in customer inventories. He sees continued improvement in construction and a broadening in steel requirements for machinery makers.

Steel Prices Cut by Chicago Warehouse

Central Steel & Wire Co., Chicago, has effected price reductions on galvanized sheets ranging from $8 to $12 per ton. Other big warehouses indicate they'll follow suit. Robert J. Heggie, president, A. M. Castle & Co., for example, said: "I feel sure that any major competitor will have to follow."

Armco's Johnston Says Price Hikes Must Come Soon

Price adjustments in some lines of steel must come soon to offset rising costs, Logan T. Johnston, president, Armco Steel Corp., said last week. "We have to do more in this industry than just meet our dividend requirements," he asserted. "It is still too soon" to predict when the hikes will come, he said. He reported that Armco's shipments in July and orders for August are both above the like 1960 levels, and said: "We are optimistic about the remainder of the year."

Phillippe and La Pierre Get Top GE Posts

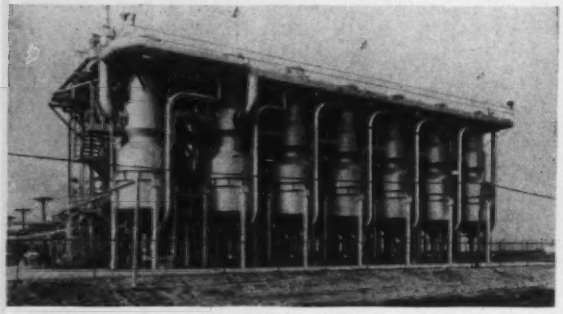
Gerald L. Phillippe (photo), formerly comptroller, has been elected president of General Electric Co., and Cramer W. La Pierre, formerly vice president-electronic and flight systems, has been named executive vice president. Ralph J. Cordiner relinquishes the title of president, but will continue as chairman —and all operating components of the sprawling enterprise will continue to report directly to him. Mr. Phillippe will directly control all staff functions, including accounting, engineering, law, management consultation, manufacturing, marketing, relations, research, and treasury. Mr. La Pierre will direct his efforts to all planning activities of the firm, to special business situations, and to emphasis of the company's technical progress.

How BDSA Sees Outlook for Four Industries

The Business & Defense Services Administration has begun its series of reports on the second half outlook for key industries. Here's a summary of the first four reports: **Aluminum**—Increasing shipments to domestic customers during the second half are expected to bring the annual total to a

level above that of 1960. **Textile Machinery**—Production may be somewhat below 1960's record $500 million. **Steam Turbines**—Orders will continue upward but at a slower pace than in 1960. **Magnesium** — A second half upturn should result in greater consumption this year than last.

Salt Water Conversion: Big New Market Is Born

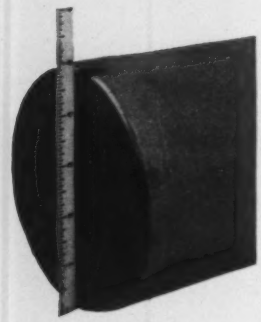


The Interior Department's demonstration plant (photo above) at Freeport, Tex., is a symbol of what will become a giant new industry and a big market for metalworking. Water desalinization looms as a necessity for most of the countries in the Free World. Interior Secretary Udall (photo) sees desalting as a key to the solution of the world's pressing water problems. For tips on the size of the market and how to get into it, see Page 41.

McDonald, Hoffa Top Union Spenders

David J. McDonald, president of the United Steelworkers, was the top spender among upper-bracket union leaders last year. His expenses, in addition to salary, totaled $38,619, the union's statement to the Bureau of Labor-Management Reports shows. Teamster boss James R. Hoffa ranked second with $2745 in "allowances" and $17,081 in "other disbursements."

Particle Control Beefs Up Compacts



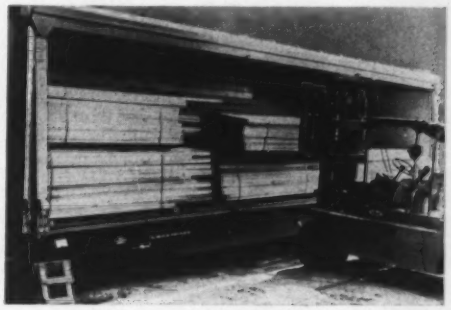
You can control the strength of pressed compacts of powdered metals by controlling the particle size, size distribution, and particle shape, as well as compacting pressure. Green strength determines your ability to handle the parts before sintering. It becomes particularly important as the size (see photo) and complexity of powder parts increase and tougher metals are used. For example, the use of irregularly shaped tungsten particles will help build the green strength of compacts (Page 66).

Will Germany Help Solve U. S. Unemployment?

Some unemployed U. S. steelworkers may get an opportunity to take jobs in the booming German steel industry, where there is a manpower shortage. The idea is being studied by Ramsey Harris, a director of the American Students' Information Service, which sends U. S. students to Europe. He has contacted the Ohio State Employment Service about the plan.

Boxcar Has Giant Door

This Full-Door boxcar is the first of 200 being built for Southern Railway System by Pullman-Standard. The door opening is 50.5 ft. The aluminum door rolls into the ceiling of the car, like an overhead garage door.



BLS Studies Construction's Effect on Employment

At the current rate of construction, the building of public schools is providing full-time employment for about 275,000 workers. More than 115,000 are required at the sites and 160,000 in industries providing materials and services. So finds a survey by the Bureau of Labor Statistics, first in a series measuring the impact of various types of construction on the nation's employment. BLS reports that each $1000 of school construction takes 84 manhours on-site and 128 manhours off-site.

FTC Reveals Trend in Profit Return

The Federal Trade Commission has made public a report on rates of return (after taxes) on stockholders' investment in selected manufacturing industries for three years:

	1940	1958	1959
Blast Furnaces, Steelworks & Rolling Mills	8.2%	8.1%	8.1%
Primary Smelting & Refining, Nonferrous Metals	10.6	6.6	7.4
Tin Cans & Other Tinware	9.4	10.4	9.0
Engines & Turbines	14.8	9.6	13.2
Office & Store Machines	12.3	13.7	14.3
Electrical Machinery, Equipment & Supplies	14.4	12.1	14.0
Motor Vehicles	17.4	8.7	16.2
Motor Vehicle Equipment	15.1	6.1	12.4

Diamond Knife Becomes Precision Cutting Tool

This diamond knife, with a radius equal to 12 carbon atoms, will make high precision cuts in metals and nonmetals. Produced by E. I. du Pont de Nemours & Co. Inc., it is now being used in research projects. The firm has made such knives up to 9/32 in. long. They're resharpenable. For details, see Page 70.

Seven Firms Charged with Antitrust Violations

Seven firms serving the oil industry have been charged by the Justice Department with violating Sections 1 and 2 of the Sherman Antitrust Act. The firms: Borg-Warner Corp., Dresser Industries Inc., Halliburton Co., McCullough Tool Co., Pan Geo Atlas Corp., Schlumberger Well Surveying Corp., and Jet Research Center Inc. The complaint charges the firms pooled know-how, made Borg-Warner the exclusive agent for all the defendants' jet process

STEEL
The Metalworking Weekly

August 7, 1961 Vol. 149 No. 6

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patent rights, denied the sale of certain supplies to nonlicensees of the patent pool, and discouraged price competition.

How Depreciation Affects Employment, Growth

A new survey by the American Economic Foundation links this nation's unemployment problem and low rate of growth to our outmoded depreciation rates. This table tells the story:

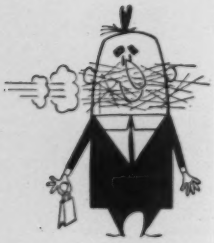
	Depreciation Allowed in First 5 Years	Rate of (1) Economic Growth Index: 1953=100	Percentage of (2) Unemployment
Japan	More than 100%	325	1.1
Italy	100%	207	5.4
West Germany	76.3%	188	Less than 1%
France	90%	185	Less than 1%
Sweden	100%	148	1.7
England	65.6%	136	1.6
Canada	66%	127	11.1
U. S.	40%	114	6.8

(1) Industrial production. Figures are for March, 1961. Source: United Nations.
(2) Figures are for 1960.

Japan, India to Use Swedish Centrifugal Casting Process

Japan's Shin-Nippon-Koki Co. Ltd. and India's Prakash Engineering & Rolling Mills Ltd. will manufacture cast iron soil pipe via the centrifugal casting method under a license from AB Akers Styckebruk, Swedish steel firm. So reports the Swedish Chamber of Commerce of the U. S. A.

Straws in the Wind



The International Molders & Foundry Workers Union has been defeated for the third time in a union election at Mesta Machine Co.'s West Homestead (Pa.) Works ... Japan produced a record 13,225,000 tons of steel during 1961's first half to move it past Britain into fourth place among steel producing nations, the Japan Iron & Steel Export Association reports . . . The petroleum industry will buy $50 million worth of electronic, remote control supervisory systems annually by 1965, predicts Moore Associate Inc., San Carlos, Calif. . . . The Industrial Fasteners Institute's seasonally adjusted index of shipments (1956-58 = 100) rose to 90 in. June from 86 in May and 75 in April, for the highest level since September, 1960.

Metalworking Pulse

The Business Trend: Declines in steel and auto output more than canceled out a record high in production of electricity and a small increase in freight carloadings in the latest week, resulting in a 3 point drop in STEEL's industrial production index. **Autos:** Only Ford Motor Co. is still turning out 1961 models. The 1962 model run at Studebaker-Packard Corp. is being kicked off today. **Steel:** Ingot rates were cut back as orders, mainly automotive, failed to meet expectations.

- **INDUSTRIAL PRODUCTION INDEX** (1947-49 = 100)
  - Week ended July 29 .... 163†
  - Year ago 153
  - Details on Page 51
- **PASSENGER CAR OUTPUT (UNITS)**
  - Week ended Aug. 5 . 35,000*
  - Year ago 103,504
  - Details on Page 48
- **STEEL INGOT OUTPUT (TONS)**
  - Week ended Aug. 5 1,790,000*
  - Week ago 1,818,000
  - Details on Page 102

†Preliminary. *Estimated.

UNITED®

4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

1901 UEFCO 1961

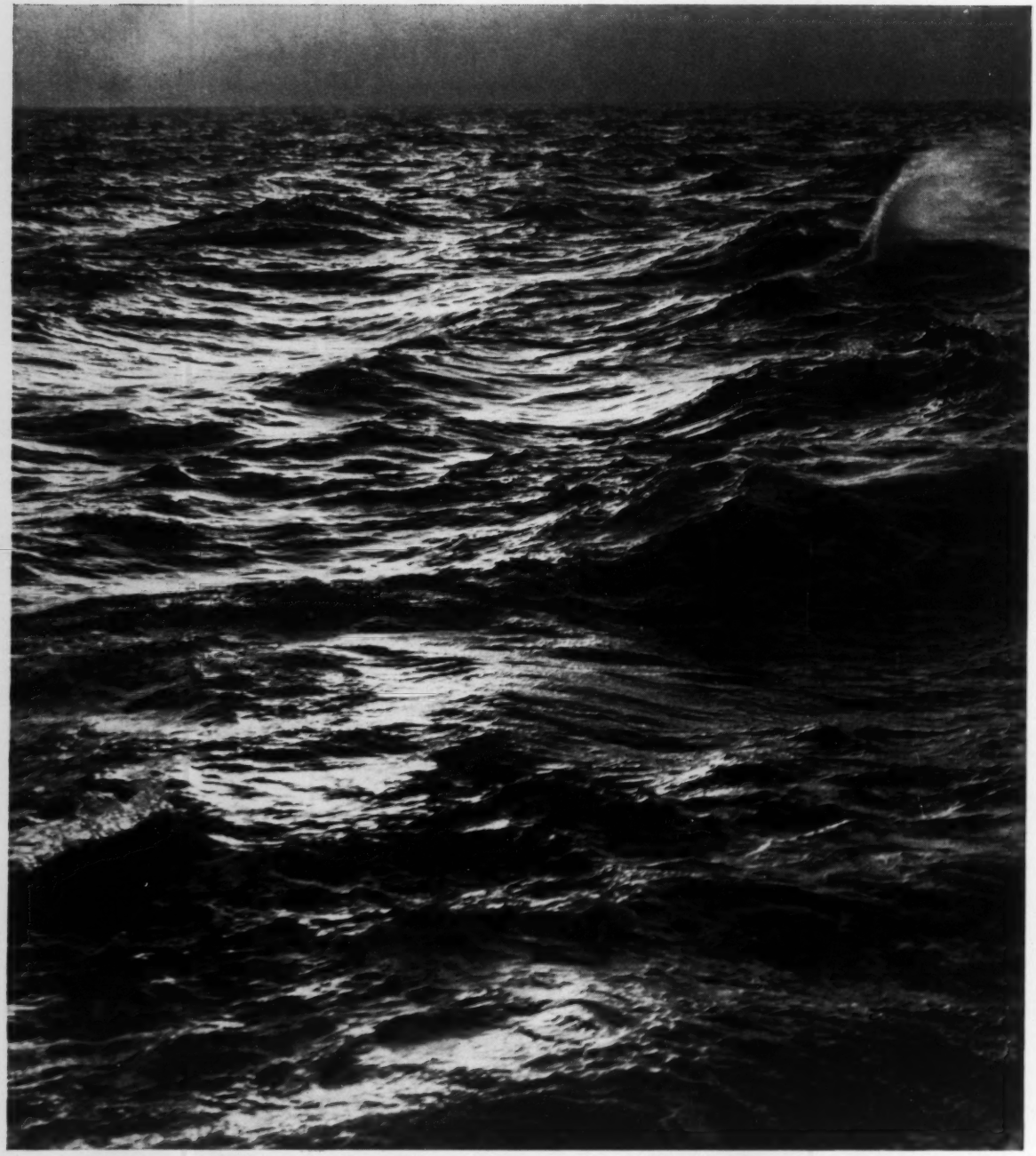
Progress... Leadership
United for Sixty Years

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



There's business out there.

You're looking at more than a horizon. It's a future, yours and America's. Out there is Europe and Latin America and Asia and Africa. But in 1960, of all U.S. manufacturers, less than 5% saw these foreign shores for what they are worth: a 19-billion-dollar export market, a vast source of foreign trade.

Move in for your share. Build your business and help keep America growing. Extra production creates more jobs, helps balance the outflow of gold, and wins new friends abroad with U.S.-made products.

Even if you've never sold overseas, you have a rare opportunity to start—now. Your U.S. Department of Commerce will help with counsel by experts on what, where and how to sell—with data on credits, payments and financing. A package of invaluable know-how is yours for the asking.

Now's the time to discover the many ways in which your business can grow. In the lucrative export markets. In new U.S. markets. In developing new products. In attracting new industry to your community. Just write or phone the U.S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. They are ready to help you grow with America!

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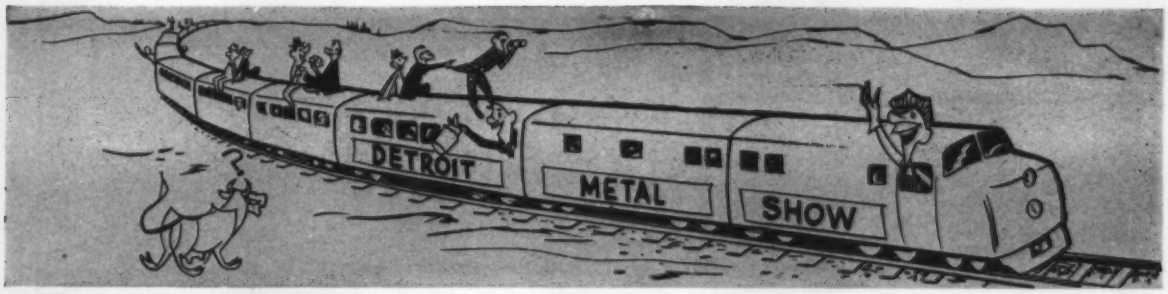
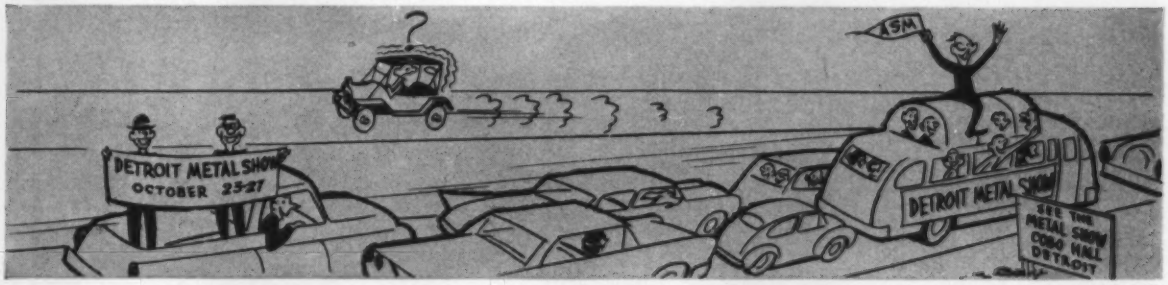


EVERYONE...



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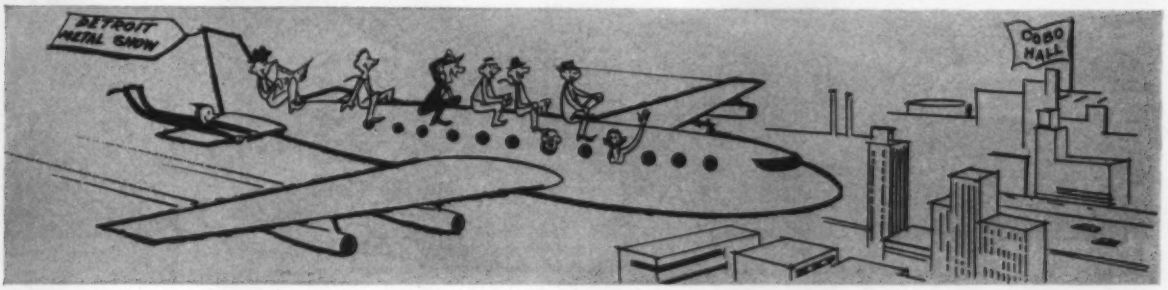
(Well, almost everyone)...



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Advance Registration Manager, ASM Headquarters, Metals Park, Ohio
Gentlemen: Please register myself (and the names of my associates listed below) for the forthcoming METAL SHOW at Cobo Hall in Detroit.

Name	Title	Indicate Affiliated Organization*	Registration Fee for ASM Sessions and Exposition: $2.00. (Except as noted below)

(Enclose check or money order) TOTAL

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☐ ASM Members: NO REGISTRATION FEE for ASM Sessions and Exposition.
☐ AIME Members: $5.00 Registration fee includes AIME sessions, ASM sessions and Exposition;
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This sidewalk is wired for snow

Nickel alloy electric heating cables in the concrete melt snow as fast as it falls!

No shoveling, no salting, no customer accidents on slippery sidewalks at *this* suburban branch of a Pittsburgh department store. Electric heating cables keep the sidewalks clear of snow and ice during even the worst winter weather.

Saves maintenance costs. In addition to taking the bother out of blizzards, the system eliminates the cost of conventional sidewalk clearance. And further savings are realized because the heating cables – made of 80% Nickel – require no maintenance.

High Nickel alloy cables were used because of Nickel's superior resistance to corrosion, fatigue and extreme temperatures. These Nickel alloy cables will withstand years of repeated heating and cooling, and seasonal expansion and contraction of the concrete.

Just one example of Nickel's versatility. Electric heating cables—also used to melt snow and ice from roofs and driveways – is another example of how Nickel helps make possible new products and processes, and improves existing ones. In most any application, Nickel's wide range of important properties . . . corrosion resistance, strength, long life and beauty, to name just a few . . . offers proven advantages.

If your business is metals, or if you use metals in your business, call on Inco for the latest information about how Nickel and its alloys can help you.

Imbedded near the concrete surface, electric heating cables of 80% Nickel keep the sidewalks clear of snow and ice. Cables made by Edwin L. Wiegand Company, Pittsburgh.

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Let's Pay for Engineering!

For the last two years, we have been exposing some of the evils of "free engineering." We can report progress—but not enough!

Here are three encouraging examples:

1. A number of companies (including one of the largest) now include this protective clause in formal proposals:

> **"All the information in this proposal is confidential and has been prepared for your use solely in considering the purchase of the equipment described. Transmission of all or any part of this information to others or use by you for other purposes is unauthorized without our written consent."**

2. An auxiliary pipeline equipment company has adopted a new policy which it explains this way:

"We have performed engineering services gratis in the name of sales expense and overhead. We do not feel that the burden of these costs should be borne by customers for standard products. When customers and prospects digress from standard designs, engineering fees will be included in quoted prices. Where engineering is required, we will either ask for a preliminary engineering fee to quote accurately, or we will make a rough estimate, with detailed engineering and final price to be determined after receipt of order.

"In the past few weeks we have found that customers and prospective customers for engineered products not only do not mind paying for the engineering, but in most cases they expect to be charged."

3. A power company requested bids for equipment from three companies. The one that got the contract spent $60,000 preparing the bid. So the power company sent $40,000 to each of the unsuccessful bidders. Consequently, both will bid for future business.

In contrast, we get many reports from people who were "thrown out of the running" when they added engineering charges. We also hear that "free engineering" is especially abused by prime contractors with government work.

As we see it, the problem can only be solved by a better understanding on the part of both buyers and sellers that engineering is never "free."

We think every seller and buyer of engineered products should adopt this slogan: "Let's pay for engineering!"

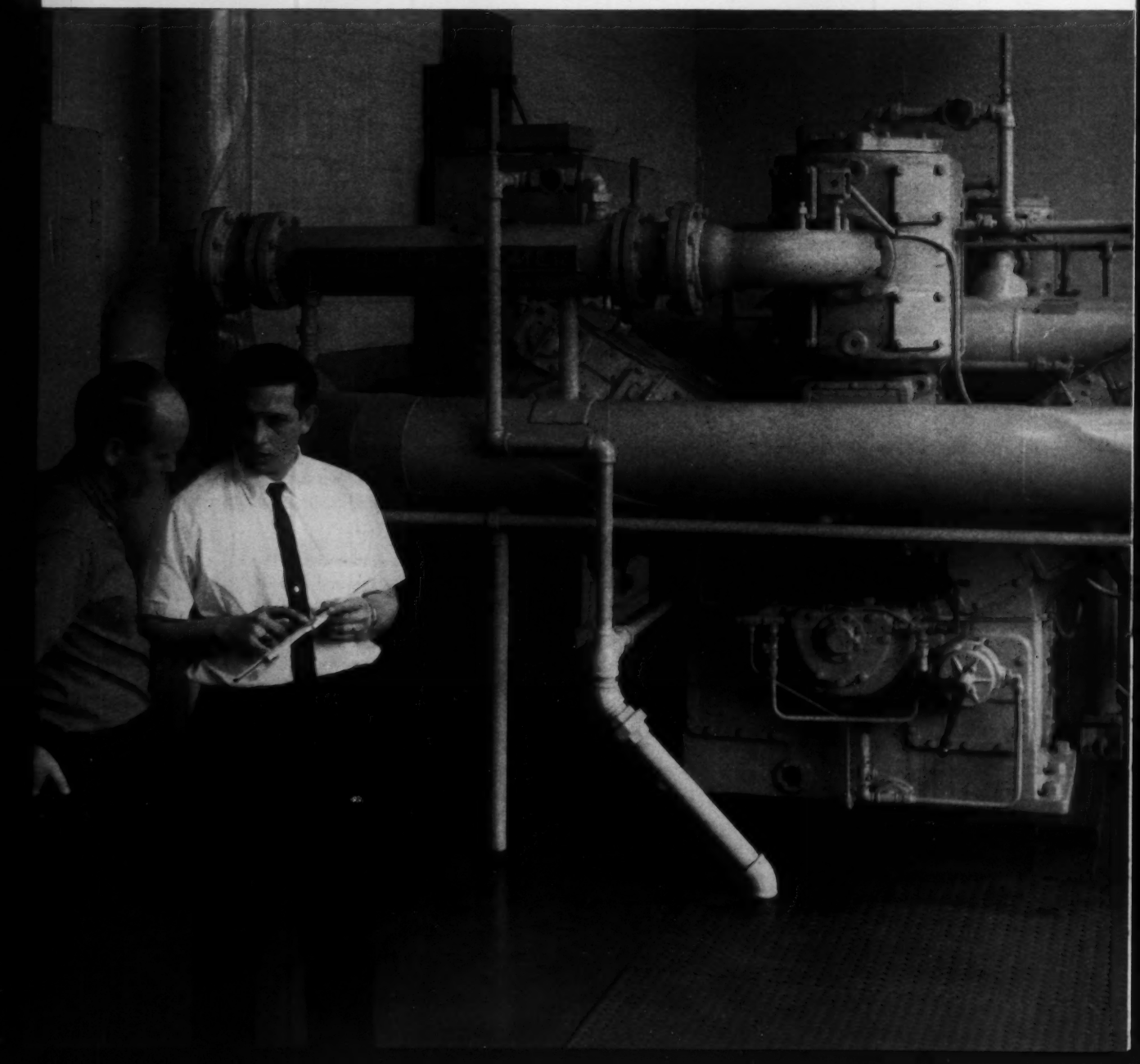
Irwin H. Such

VICE PRESIDENT-EDITORIAL

How DMR Air Compressors boost

Users everywhere report important economies by stepping up compressed air capacity with the new Cooper-Bessemer DMR compressors. These *compact*, 720 rpm machines, unmatched in reliability, are enabling plants to boost output with air tools and, at the same time, conserve compressor floor space and installation cost. In most cases, these units can be installed in existing space near the production load to minimize housing and piping needs.

The new DMR compressors are completely



your production...cut floor space needs

equipped with integral motor drive and intercooler ... ready for operation. Their En-Tronic control, also integrally mounted, automatically regulates the compressors to meet the demands of the air system. They are available in 2 or 3 cylinder designs, 150 to 400 hp, 698 to 2005 cfm at discharge pressures up to 125 psi.

For full particulars, call the nearby Cooper-Bessemer office or air compressor agent. Write for Bulletin 94 on the new DMR line.

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COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
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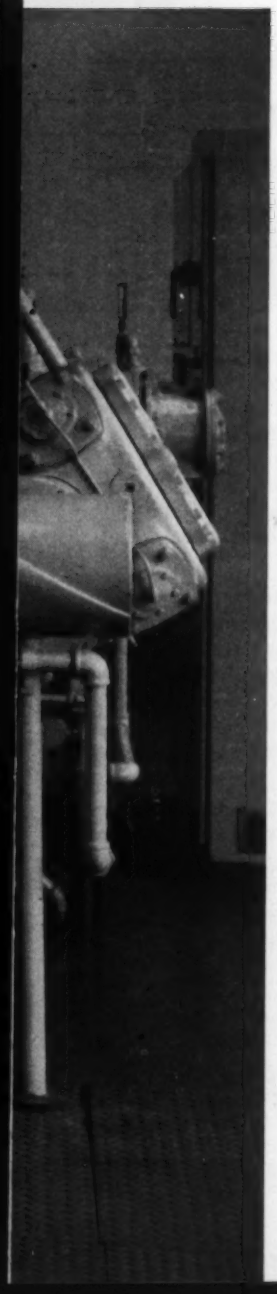


IN A FOUNDRY

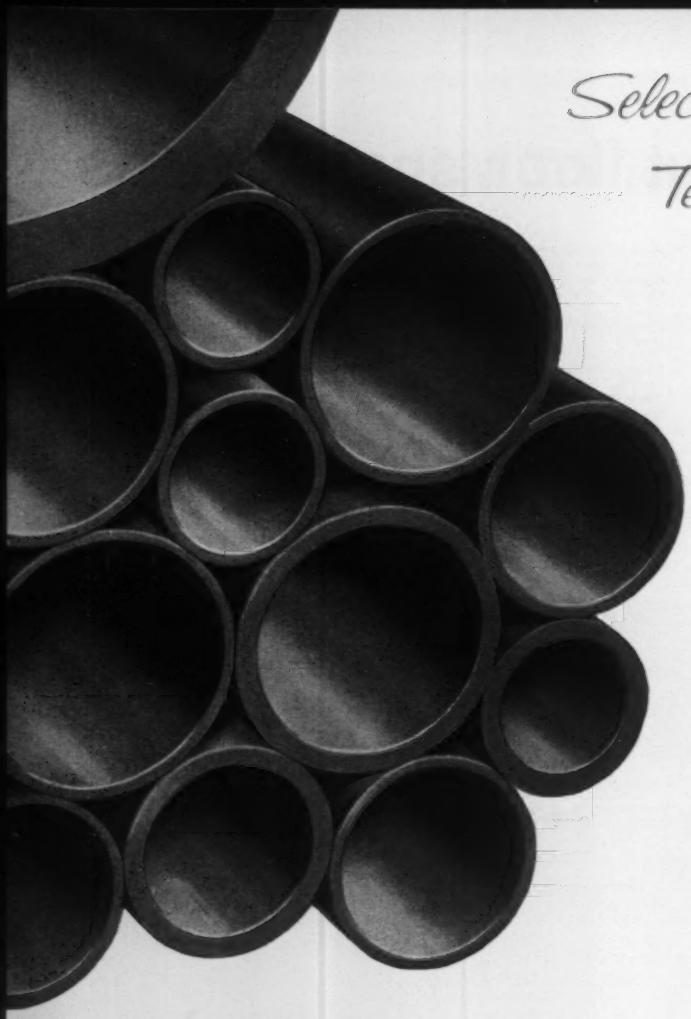
... This Cooper-Bessemer DMR-3 air compressor delivers 1658 cfm for portable tools in a Pennsylvania foundry.

IN A FABRICATING PLANT

... This Cooper-Bessemer DMR-2 compressor supplies 757 cfm air at 125 psig pressure for portable tools.

COMPLETE INFORMATION

on the new line of compact DMR compressors is given in this booklet... free on request. Ask for Bulletin 94.



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Testing every step of the way

Inspection to rigid standards

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OHIO WELDED PRESSURE TUBING

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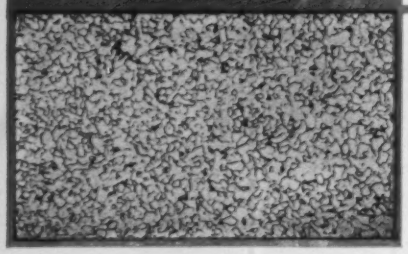
Carefully selected prime raw material is slit, edged, shaped and electric resistance welded on the most versatile and modern equipment in operation. At each and every step of the way Ohio Welded Pressure Tubing is under the scrutiny of Ohio's master tubemakers . . . making control tests at frequent intervals . . . testing random samples from each production order far beyond the limits of the usage involved.

For critical pressure piping applications . . . for condensers, heat exchangers, boilers and superheaters — in the range of sizes from ½ to 7½" OD and wall thicknesses from .028 to .375"— mark your prints "*Ohio Custom Made Welded Pressure Tubing.*" There is no equivalent.

Photographs show flare, flattening and crush tests performed continuously on every order. Non-destructive tests include air, water, magnetic, eddy current and visual inspection to insure 100% dependability.



Photomicrograph of polished and acid-etched surface shows perfect microstructure of normalized Ohio Welded Pressure Tubing. Weld area running down the center is now indistinguishable and tube has become, in every sense, weldless.

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As bargaining tempo quickens . . .

What to Expect from Auto Talks

1. **Settlement will come with no company-wide strikes.**
2. **Big Three will sign contracts for at least two years.**
3. **American Motors will sign for at least two years, but on terms different from the Big Three settlement (perhaps including a modified profit sharing plan).**
4. **The Big Three's package will cost 7 to 10 cents an hour per man for each year of the contract (excluding 3 cents in escalation).**
5. **Pensions will be liberalized slightly.**
6. **Supplemental unemployment benefits will be substantially modified (including severance pay provisions).**
7. **Cost of living (COL) and annual improvement provisions will be retained, but COL will get a ceiling, perhaps by tying it to insurance costs as in the steel industry.**
8. **Companies will not accept salary rating concept.**

LOOK FOR brass tack bargaining in the Big Three auto talks to begin this week.

As of presstime late last week, GM, Ford, and Chrysler negotiations had been confined largely to secondary issues and interpretations of "facts" by each side.

• **AMC's Case**—The only general offer made by automotive management came July 28 from American Motors Corp. AMC proposed giving workers a 10 per cent cut of profits before taxes after deducting 10 per cent of the company's net worth for stockholders. The stockholder figure would be $22 million on the company's net worth of $220 million.

The share for AMC's 23,000 hourly employees would go into a fund which would be available for distribution as cash bonus, or for expansion of such benefits as health care or supplemental unemployment benefits. Based on annual profits of $100 million (AMC's earnings in its last fiscal year were $105.4 million), an average employee's share of profits would be $340.

• **Strings Attached**—AMC tied at least two important strings to the offer: 1. The UAW would have to give up cost-of-living increases. 2. The union would have to forego the annual improvement wage increases of 2.5 per cent.

The union admitted its surprise. In 1958, Walter Reuther proposed profit sharing and was turned down. Under his plan, profits equal to 10 per cent of net capital would be set aside as return on the company's investment. Of the remaining profits, 50 per cent would go to stockholders and company executives, 25 per cent to hourly and salaried employees, and 25 per cent to customers as rebates.

• **Rejection**—Watch for the UAW to reject the company's offer because of the strings. But public relations considerations will force it to do so gently. Although AMC claims its package must be accepted

fully or not at all, don't be surprised if a watered down version gets into its contract.

No version of any sort is likely in the new Big Three contracts. AMC is a special case. Besides being much smaller, its operations are also simpler because it is primarily an assembler. The Big Three are assemblers and manufacturers, and profit sharing would be more difficult to administer.

• **Conventional**—At this date, odds are that the Big Three contracts will be conventional (see the accompanying predictions). The UAW is not serious about the salaried concept. It is more so about the escalator provision in pensions, but doesn't expect to get it this time. It may make more conversation and headlines about profit sharing now that AMC has introduced the matter, but it knows the issue will make no more headway with the Big Three in 1961 than it did in 1958.

You can risk long odds against a company-wide strike. There will even be fewer local walkouts than there were three years ago because much of the negotiating work thus far has been on local matters that caused the disturbances the last time. Example: Extra attention has been given to special provisions for the highly skilled.

• **Aug. 31 Settlement?**—The pace of the talks has been so slow that settlement may be impossible by the Big Three's termination date (Aug. 31). When GM went through the formality (on July 31) of announcing its intention to terminate the pact one month later, it said the notification "should not preclude a discussion of the possibility of a limited extension."

If the pacts aren't signed by Aug. 31, short extensions are more likely than working without a contract, as in 1958. The no-contract approach won't be taken unless the signing can't be managed even with an extension or two.

The union obviously isn't keen about contractless work. While the companies found operating under the hiatus in 1958 no great hardship, it did damage union relationships. So, management also will take the no-contract route only as a last resort.

Top Bargainers in Ford Labor Talks

Kenneth Bannon
Director, Ford Department
United Auto Workers

Bustling Ken Bannon was born in Scranton, Pa., June 27, 1914. After spending his boyhood in the Pennsylvania coal mining area, he went to Detroit in 1936 where he started working at the Ford Rouge Plant. As an active rank and file leader in the UAW's effort to organize the Rouge, Mr. Bannon served as steward, committeeman, unit vice president, and other jobs representing Ford workers—both at the Rouge and Highland Park plants. He took over as director of the union's Ford department in 1947 and has been instrumental in some of the union's greatest victories, including the first industry-wide pension plan in 1949.

Kenneth B. Cassidy
Vice president-industrial relations
Ford Motor Co.

Born and raised in Detroit, Ken Cassidy began his business career as a reporter and financial editor in Detroit. (For a short time, he was a STEEL correspondent.) He entered the automotive industry as an accountant with GM in 1934 and joined Ford in 1946. He became general manager of the Manufacturing Services Div. in 1951, general manager of the Steel Div. in 1953. He was general products group executive from 1956-58, then group director-body group until he was elected to his present job October, 1959. Sixty-three-year-old Mr. Cassidy is primarily responsible for collecting the vast array of facts and figures Ford negotiators are throwing at the UAW in this year's talks.

Malcolm L. Denise
Vice president-labor relations
Ford Motor Co.

Mel Denise is respected as an auto bargainer. He holds bachelor and law degrees from the University of Michigan. After nine years of legal practice, which included five years on the staff of Ford's former legal counsel, he joined Ford in 1946 as associate industrial relations counsel. He was named vice president-labor relations in October, 1959. Mr. Denise handles the day to day bargaining with the union. His incisive language cuts the fat from bargaining talk.

UK Seeks Help in Common Market

PRIME MINISTER Macmillan told Parliament that he wants Britain to join the Common Market to help cure some of her economic ailments. Britain has remained outside the European Economic Community (EEC) since its inception four years ago, but economic pressures now make it necessary to go after a bigger share of the booming continental business.

• **Boom**—The Common Market is regarded as the world's fastest growing buyer of manufactured goods. For the last four years, the UK has watched the EEC blossom in wealth, industrial output, prestige.

The gross national product of EEC countries gained 31 per cent from 1953 to 1959, while Britain and the other European Free Trade Association (EFTA) members had a growth of only 19 per cent.

With the loss of her empire in postwar years, Britain has found that isolation from the continent is no longer working in her favor. She faces economic problems, while the rest of the world, particularly the Common Market, is prospering. Last year, Britain had a foreign trade deficit of nearly $1 billion.

If Britain moves inside the EEC tariff barrier, she will stand a good chance of boosting her exports to the member nations considerably. She is already sending 15 per cent of her exports to them despite the tariffs. Deeper penetration of the market would improve her balance of trade and step up her industrial activity.

• **No Panacea**—Common Market membership would not be a cure-all for Britain's economic troubles. Many people fear that British industry and labor would suffer from unrestricted competition with producers on the continent.

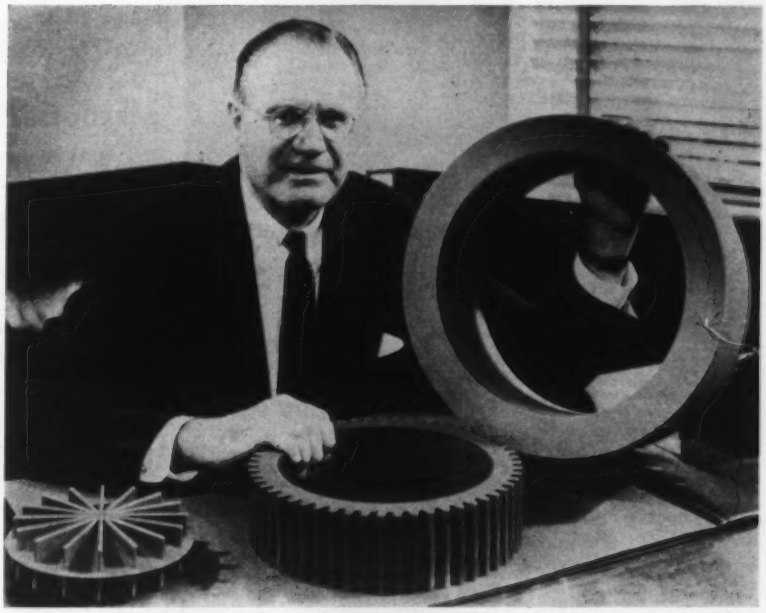
The UK will enter the Common Market only if the Treaty of Rome is modified in certain respects, or if certain concessions are granted to her. Two grounds for objection to the present treaty are:

1. The UK fears the political involvement resulting from EEC membership. She will not jeopardize her political sovereignty to grab at an economic advantage.

2. The UK cannot turn her back on nations of the British Commonwealth who enjoy preferential trade arrangements. They depend heavily on her as a market for agricultural products and raw materials. Australia, for example, ships one-third of her exports to Britain.

• **European Integration** — Should Britain enter the Common Market, she is likely to be followed by other EFTA members, such as Denmark, Norway, and possibly Portugal. Her EEC membership might be the start of an eventual merger of the two economic blocs.

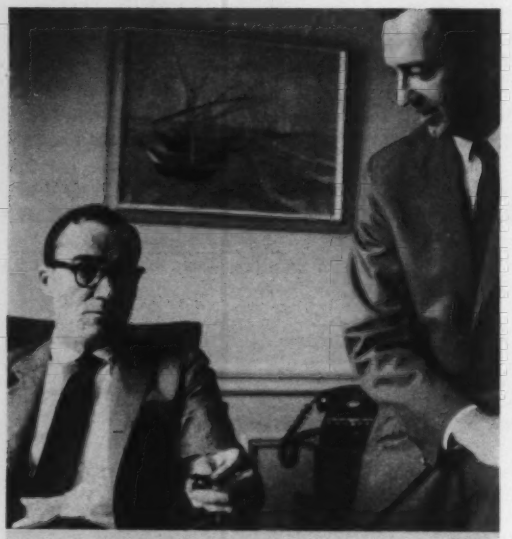
Emile Benoit of the Columbia University Graduate School of Business says such a merger would have a diversionary effect on U. S. trade. "It would considerably increase the number of products on which we were exposed to intra-European competition . . . and always at a tariff handicap." Mr. Benoit points out two factors which would offset any adverse effects this might have on U. S. trade with Europe: European producers would probably concentrate on European markets, permitting the U. S. to acquire additional business elsewhere in the world. Integration would spur Europe's growth rate, creating a greater demand for products than Europe itself could supply.



Nylon Parts Getting Bigger, Cheaper

EXTRA LARGE nylon castings can be made cheaply and quickly with a new process developed by Polymer Corp., New York. It employs raw monomer which costs half as much as conventional polymer nylon. The product resembles a regular metal casting, says Polymer, and it is expected to make such castings competitive with metal types in metalworking equipment and papermaking machinery.

How to Make Meetings Pay Off



In studying thousands of meetings, James O. Rice (left) and Edward Malott Jr. conclude: In most cases, only a tenth of the potential is realized

Large Conferences

1. OVER-ALL

- Determine objectives of the meeting. Is it to present or share information? Or is it primarily a social gathering?
- Assign specific responsibilities.
- Integrate the sessions.
- Follow up to assure conformity to plan, to assignments, to deadlines.

2. CONTENT

- Find out what persons attending need. (Don't ask what they want; discover what their problems are and what is of concern to them.)
- Give speakers as much guidance as possible.

Smaller Groups

1. CONTENT

- Clarify the objective, and make sure it is understood. Don't, for instance, pretend that the group is to arrive at a decision when you are, in fact, going to make the decision yourself.

2. PROCESS

- Whenever possible, schedule meetings in advance.
- Where possible, circulate an agenda so participants can make adequate preparation. Allow opportunity for alteration of the agenda to gain greater participation.
- Make certain all those affected by the meeting are represented.

MANAGERS COMPLAIN that they have to attend too many unjustified, unproductive meetings. They're right, echoes James O. Rice Associates Inc., New York consulting firm.

Says Mr. Rice: "In terms of achievement of stated objectives, only a tenth of the potential of most meetings is realized. What distresses us is that so many hours are spent on meetings, but there is little attempt to build a rationale for doing them well. The tendency is to handle meetings at random in many companies."

• **First Step**—Most important, emphasizes Edward O. Malott Jr., vice president, is to determine the objective of a conference or meeting. These steps form the basic approach to getting the most out of meetings, he says:

- Clarify the purpose of the meeting.
- Evolve the subject matter.
- Determine the methods to be used.
- Plan the physical arrangements.

Among other basic functions, a properly planned meeting:

1. Provides "feedback" to the convener—he gets an almost immediate reaction to the content of the meeting.
2. Stimulates thought: The contribution of one member sparks contributions by others.
3. Helps lead participants who must implement a decision.
4. Allows a proposal or announcement to be made to several people simultaneously. The chance of distortion is minimized because there is an opportunity to clarify.

Outline the scope of their presentation. Acquaint them with the nature and interests of the audience.

3. PROCESS

- Don't distribute copies of a talk that is to be given verbatim.
- Make adequate provision for a question and answer session.
- Provide a change of pace through different forms of presentation: Lecture, panel, skit, film, discussion, etc.
- Provide at least some opportunity for genuine participation (but don't include a participative device just to be using it).
- Get feedback on how the meeting is going. That enables you to brief upcoming speakers on the climate of the session. It will show you how to improve on the next meeting.

4. HOUSEKEEPING

- Anticipate the audience's comfort needs (chairs, tables, ash trays, water, air conditioning, acoustics, etc.)
- Make sure visual aids are large enough and properly placed.
- Stick to the time schedule.

- Recognize two levels of the group's operation:
  a. Task level: Getting the job of the group done.
  b. Maintenance level: Facilitating relationships of the group itself for smooth functioning. That holds the group together, builds rapport among its members.
- Help members to assume responsibility for the group's progress.
- Avoid evaluative comments. If chairman is also the boss, such comments tend to inhibit creative discussion.

3. HOUSEKEEPING

- Anticipate the comfort needs of participants (enough room at the table, supplies, ventilation, etc.)
- Try to assure that there will be no interruption.
- Where appropriate, encourage the use of chalk board or chart pad for summary, clarification, or attention focus.

4. GUIDEPOSTS

- As chairman, avoid overcontrol of the meeting. Do not use the conference as a vehicle to show that you are "smart" or that you are "right."
- Recognize the existence of any blocks or barriers among individuals involved in the meeting and resolve them so that the group as a whole can be truly productive.

• **Two-Way Street**—Maximum participation is desirable. People can absorb just so much one-way communication. They don't want to be "talked at" throughout a conference.

Rice Associates, which plans and executes large conferences for companies and associations as well as offering business education techniques to firms, suggests a number of methods for gaining audience participation.

"We like to break large audiences up into subgroups for discussions," Mr. Malott says. "The time allotted is a matter of judgment. We tell our clients not to lecture on that which is or can be presented in written form."

Other techniques:

• Form "buzz groups." Rows face one another, exchange information, clarify points. "This way everyone has a stake in what's going on," Mr. Malott adds.

• Select a representative panel from the audience which will then quiz the speaker (or a spokesman for the panel may ask questions).

• Assign listening groups for particular areas of a talk. This method heightens interest in certain portions of a speech and helps develop better discussion later.

• **Prepare the Speaker**—Setting subject area boundaries for a speaker instead of "just telling him to talk" is important. It preconditions the speaker to develop explicit material. Subject gaps as well as overlaps are avoided.

"You raise the standard for performance for the entire meeting by

properly preparing speakers," Mr. Rice points out. If your program runs two days, second day speakers should be brought up to date on events of the first day. Tell the speaker what the audience has been especially interested in and what the general climate of the meeting has been."

Rice Associates says people at meetings often sit back and think: "All right, it's the chairman's show; let him run it!" (That reaction may stem from a long tradition of misused meetings.)

• **Effective Group Members**—A real contribution can be made to meetings, Rice Associates points out, by participants who:

• Share responsibility for seeing that the task and maintenance functions (see exhibit on small meetings) are done appropriately.

• Have the courage to express true feelings and encourage others to express theirs.

• Recognize the importance of timing and controlling their own contributions.

• Do not use the group for personal ends (to show off, or air grievances, for example).

Improvement, Rice Associates says, is not the result of fewer meetings but more effective ones. Progress requires:

1. Understanding of what can be accomplished via meetings.
2. Creating conditions that encourage accomplishment.
3. Developing participant skills.
4. Recognizing that success is the responsibility of all members, not merely a few.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Product Lines Serve as Meeting Props

AT Black & Decker Mfg. Co., Towson, Md., members of the product development committee use a backdrop of product lines to illustrate a point.

Considered one of the firm's most important conferences, the committee meets twice a month.

Members include the firm's top officers, plus marketing, engineering, and production executives.

Says Robert D. Black, chairman: "Meetings are primarily a matter of communications. The number necessary is a product of the size of an organization.

"We have more committees now but fewer meetings than we had three years ago. I believe the personnel at meetings should be kept to an absolute minimum."

A random survey of several Black & Decker managers showed that top executives spend as much as 75 per cent of their time in meetings, other executives 25 to 50 per cent.

What JFK's Defense Boost Means to You

METALWORKING'S stake in the extra $3.5 billion in defense appropriations sought by President Kennedy is a big one. If the request wins approval, the fiscal 1962 defense budget will come to about $47.5 billion—actual spending will be $46.6 billion.

Here are the major increases of interest to metalworkers:

• **Army**—The $552.4 million in additional spending includes: Tactical vehicles such as trucks and trailers, $175 million; aircraft, $36.7 million; Honest John missiles, $19.2 million; Nike Hercules, Hawk missiles, $14.6 million; combat vehicles (tank recovery and personnel), $98.2 million; ammunition, $87.3 million; small arms, $1.3 million; communications equipment, $97 million; construction and heavy equipment, $23.1 million. Additional funds will be for personnel, operations, and maintenance.

• **Navy** — The $543.6 million increase in hardware includes: Aircraft (fighters, patrol planes, helicopters), $281 million; missiles (Bullpup, Sidewinder, Sparrow, Tartar, Terrier, Talos), torpedoes, communications equipment, $262.6 million. In addition, other funds are requested for modernization of some ships with latest available equipment.

• **Marine Corps** — Procurement of ammunition and electronic equipment has been upped $67 million.

• **Air Force**—The $425 million in extra funds includes: Aircraft fighters, $211.5 million; airlift modernization, $82.6 million; missiles, $8.8 million; other hardware, $122.1 million.

The defense appropriation measure also carries a request for $448 million to speed up development of the B-70 bomber.

Aid to Education Climbs

DURING 1959-60, corporate aid to education increased 6.8 per cent, reports Council for Financial Aid to Education Inc. Since 1955, alumni gifts have risen 102.5 per cent, corporate gifts 96.8 per cent.

Profits Should Climb in 2nd Half

How Metalworkers Fared

(Net income)

	First Half 1961	First Half 1960
Allis-Chalmers Mfg. Co.	$4,758,932	$7,780,145
American Brake Shoe Co.	2,083,981	3,138,068
American Can Co.	20,339,000	17,342,000
American Machine & Foundry Co.	12,017,000	11,309,000
American Metal Products Co.	725,114	965,532
Amphenol-Borg Electronics Corp.	463,470	1,532,948
Anaconda Wire & Cable Co.	299,899	624,738
Apex Smelting Co.	437,683	531,166
Babcock & Wilcox Co.	9,985,898	9,236,599
Baldwin-Lima-Hamilton Corp.	518,898	1,120,603
Bath Iron Works Corp.	1,149,332	1,240,493
Bliss & Laughlin Inc.	596,248	1,440,990
Brunswick Corp.	11,048,902	9,296,109
Burroughs Corp.	3,185,250	5,043,000
Caterpillar Tractor Co.	27,258,989	20,378,447
Ceco Steel Products Corp.	969,736	523,332
Central Foundry Co.	669,559	696,021
Chicago Pneumatic Tool Co.	3,606,000	4,626,000
Chrysler Corp.	(a)15,700,000	23,700,000
Clark Equipment Co.	3,629,899	4,009,989
Cleveland-Cliffs Iron Co.	2,789,418	5,097,427
Cooper-Bessemer Corp.	1,278,574	2,300,255
Copper Range Co.	390,812	(a)494,934
Crane Co.	2,053,000	1,448,000
De Vilbiss Co.	674,775	1,110,978
Diebold Inc.	939,641	856,995
Douglas Aircraft Co. Inc.	3,225,118	(a)8,769,063
Electric Autolite Co.	1,562,302	4,734,713
Electrolux Corp.	1,913,301	1,637,281
Fansteel Metallurgical Corp.	731,179	1,264,763
Ferro Corp.	1,053,000	1,729,000
Foote Mineral Co.	136,510	423,666
Gabriel Co.	345,142	(a)126,801
General Cable Corp.	3,060,316	4,602,769
General Electric Co.	93,478,000	111,429,000
General Motors Corp.	440,459,843	611,584,358
General Telephone & Electronics Corp.	32,538,000	35,180,000
Hoffman Electronics Corp.	349,657	123,054
Hoskins Mfg. Co.	607,210	686,270
International Business Machines Corp.	100,859,439	76,616,285
International Silver Co.	1,002,400	915,300
Kaiser Aluminum & Chemical Corp.	10,645,000	11,737,000
Kawneer Co.	709,022	481,897
Kennecott Copper Corp.	36,281,898	42,660,746
Link-Belt Co.	2,089,035	2,883,519
Magma Copper Co.	4,193,750	2,676,701
Maytag Co.	5,695,466	5,652,661
Metal & Thermit Corp.	725,466	626,799
Minneapolis-Honeywell Regulator Co.	10,258,369	11,984,266
Monsanto Chemical Co.	34,587,000	38,363,000
National Lead Co.	22,548,867	25,296,609
Olin Mathieson Chemical Corp.	14,401,884	18,665,887
Porter (H. K.) Company Inc.	1,846,454	2,038,655
Radio Corp. of America	17,600,000	18,100,000
Republic Aviation Corp.	5,187,283	839,378
Revere Copper & Brass Inc.	3,923,104	3,831,305
Reynolds Metals Co.	11,271,000	13,218,000
Rheem Mfg. Co.	(a)141,332	489,964
Robertshaw-Fulton Controls Co.	1,644,661	1,737,672
Rockwell Mfg. Co.	3,156,000	3,747,000
Rockwell-Standard Corp.	5,157,781	8,355,718
St. Joseph Lead Co.	3,849,092	2,504,963
Searle, G. D. & Co.	4,581,606	3,894,154
Square D Co.	5,026,642	5,356,217
Standard Pressed Steel Co.	1,100,000	2,185,000
Stewart-Warner Corp.	3,032,732	3,461,149
Studebaker-Packard Corp.	(a)8,840,172	3,359,585
Thew Shovel Co.	46,852	372,127
Thompson Ramo Wooldridge Inc.	2,071,337	5,033,861
Triangle Conduit & Cable Co. Inc.	145,377	624,542
Udylite Corp.	400,573	726,060
Union Carbide Corp.	69,395,000	81,192,000
United-Carr Fastener Corp.	895,101	1,923,385
Vitro Corp. of America	978,365	546,398
Westinghouse Electric Corp.	19,561,000	40,545,000
White Motor Co.	5,316,599	5,232,187
Worthington Corp.	2,848,466	3,786,562
Xerox Corp.	1,993,038	1,066,111

(a) loss

EXPECTATIONS for consumer spending, capital equipment outlays, exports and overseas activities add up to an optimistic outlook for second half profits.

Many metalworkers are anticipating record or near-record sales in the fourth quarter, following a seasonal slowdown in the current period.

Sales and earnings of most firms dropped below year ago levels in the first half. Second quarter business turned up, but the momentum was not sufficient for most metalworkers to offset their poor first quarter showings.

• **Steelmakers Recover**—Hard hit by the recession, steelmakers were among the first to benefit from the recovery. Second quarter profits were 2½ times those of the first quarter. Although sales were slightly below those of the year ago quarter, profits were lifted about 10 per cent by cost cutting and modernization programs.

Steelmakers still have a long pull to the January-June 1960 level. During the first half, sales were only 75 per cent as high, and earnings were chopped to about 50 per cent.

Steelmakers' Profits Slide

(Net income)

	First Half 1961	First Half 1960
Acme Steel Co.	$400,171	$2,620,916
Alan Wood Steel Co.	(a)73,981	1,205,145
Armco Steel Corp.	23,176,168	41,733,219
Bethlehem Steel Corp.	33,967,877	81,543,035
Colorado Fuel & Iron Corp.	367,585	2,414,432
Continental Steel Corp.	2,280,059	2,308,642
Copperweld Steel Co.	400,783	2,253,518
Crucible Steel Co. of America	(a)1,495,000	3,034,143
Eastern Stainless Steel Corp.	1,202,709	1,225,666
Granite City Steel Co.	4,537,805	7,644,551
Inland Steel Co.	21,749,580	33,067,503
Jones & Laughlin Steel Corp.	11,827,000	26,136,000
Kaiser Steel Corp.	5,206,000	6,874,924
McLouth Steel Corp.	7,167,451	9,675,307
National Steel Corp.	16,164,166	27,301,361
Pittsburgh Steel Co.	(a)1,455,241	2,405,194
Republic Steel Corp.	21,253,878	41,408,483
Sharon Steel Corp.	(a)261,639	1,954,856
U. S. Steel Corp.	91,004,141	193,472,241
Universal-Cyclops Steel Corp.	2,100,440	3,120,826
Wheeling Steel Corp.	1,717,000	8,156,000
Youngstown Sheet & Tube Co.	10,843,270	18,889,010

(a) loss

"We had 18-20 hours downtime every time we changed heats. With strip, we just hook on from heat to heat. No downtime."

"With strip we use smaller blanks to produce the same part."

"By using strip we save downtime, die repairs."

"Rejects have drooped from about 8% to less than 1%."

"We found we couldn't afford the low cost of sheet."

Read why Target Stamped Products, Inc., Kinsman, Ohio, switched from strip to sheet—and then back to strip. Comments are Harvey Haynman's, Target's president:

"We thought we'd give sheet a try back in 1958. The low cost looked too good to pass up. Today, you'd have a hard time finding a piece of cold rolled sheet around the shop.

"We were absorbing 18-20 hours of downtime every time we changed heats. With strip, we just hook on from heat to heat. The characteristics are the same from heat to heat and coil to coil. We don't waste time adjusting our dies.

"Strip saves us metal. We can use smaller blanks to produce the same part. I'd say we save from 1/16" to 3/32" of metal per part. That's a lot of steel when you're turning out 25-30 million parts a year.

"We don't have gauge problems now. The strip we buy is always rolled within our working tolerance. We work to a plus or minus .0025 inches.

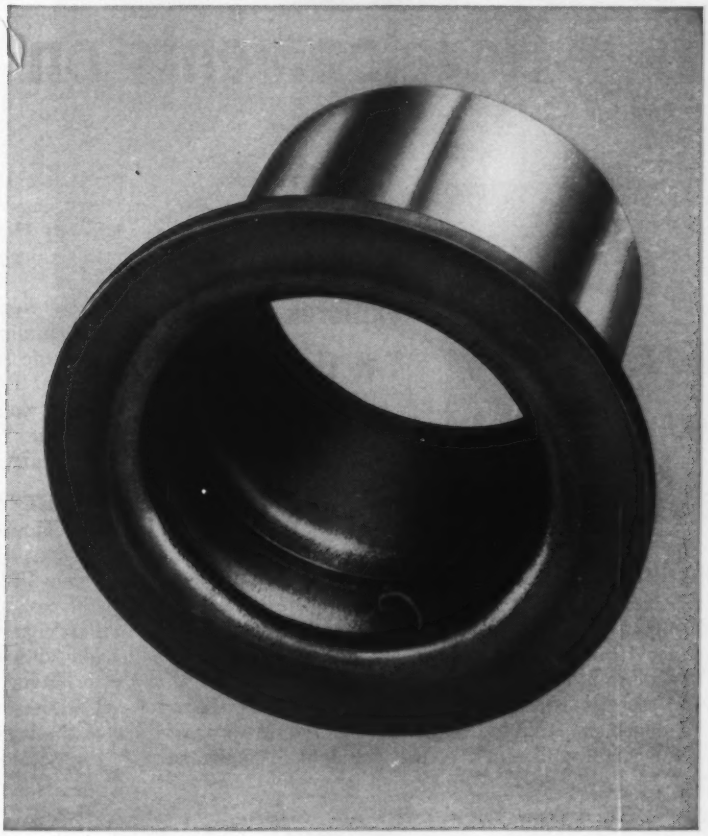
"So far, strip hasn't given us lamination troubles. It doesn't take much lamination to give you big trouble in a deep drawing operation. When the metal separates, part may stick to the punch while part stays in the cavity. As another blank transfers to the same station, there's a double smash and the die is ruined. That hasn't happened with strip. Saves a lot of downtime and die repair.

"Strip takes a deep draw without thinning out on you. Its uniform temper pays off when you're turning out Silent Blocks where both the ID and OD have to be right or the part's a reject.

"All in all our rejects have dropped from about 8% to less than 1% since we switched back to strip.

This mark tells you a product is made of modern, dependable Steel.

Outer metal bushing of a Silent Block. Target Stamped Products turns out millions of these each year for the auto industry. Silent Blocks are used in the suspension systems of all American cars—about eight to a car. To produce the piece, Target must work to a plus or minus .0025" tolerance or the Silent Block won't work. When Target switched back to strip, their rejects dropped from about 8% to less than 1%.



"You can have all the automation in the world, but if you're using the wrong steel, it just nickels and dimes you to death. With strip our machines keep working; we need less supervision, less tool repair. Our trim is small and our percentage of rejects is the smallest we've ever known. We found out we couldn't afford the low cost of sheet. That's why we're back with strip."

The switch is back to strip

Cold rolled sheet steel can be your best buy on a cost per pound basis. Certainly its quality has risen sharply since the war. But, pound cost is only part of the story. If you really need steel tailored to your specific production requirements, cold rolled strip is the answer.

Strip is not sold on an as-rolled basis. What you buy is a specific chemistry, temper, dimension, edge and finish to precisely meet your fabricating and end-use requirements.

American Steel and Wire has over 12,000 mill practices in available strip specifications. Many of your processing steps may actually be eliminated by using cold rolled strip.

Take a hard look at your production line and let our salesmen look with you. Check your rejects, your downtime, your scrap rate. Perhaps you can improve the quality of your product and cut production costs at the same time, with *tailored-to-the-job* cold rolled strip from American Steel and Wire. American Steel and Wire Division, Rockefeller Building, Cleveland 13, Ohio. USS and American are registered trademarks

USS **American Steel and Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal and Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York, Distributors Abroad

Two Developments on New Frontier

Labor secretary explores possible T-H changes

THE ADMINISTRATION intends to press for revisions in the Taft-Hartley Act in the next session of Congress. Last week, Labor Secretary Goldberg convened 19 lawyers, arbitrators, and college labor experts to explore proposed changes.

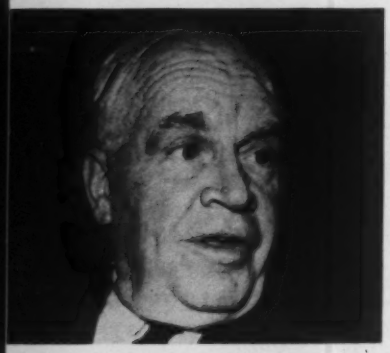
A special subcommittee of the President's Labor-Management Committee is also studying proposed changes and will report to the President in September.

Labor sources agree that President Kennedy will not seek compulsory arbitration, but he will insist on more White House tools to use in prying a settlement out of labor negotiations before a crippling national strike occurs.

He wants the tools to include the power to set up fact finding boards which can make recommendations (technically they do not make recommendations under present T-H provisions).

He wants the right to seize key industries and to use the "cooling off" periods without approval from the courts.

● **RETRAINING PROGRAM PROGRESS** — Senate and House Labor committees have approved different versions of the administration's retraining bill, so there seems little doubt a program will pass this session—it'll cost up to $300 million and run up to four years. Participants might receive a maximum of $32 per week for 26 weeks. Secretary Goldberg reports it is "unfortunate" that the moving allowance may not receive Congressional approval. He reports that upon passage of the legislation, the new Office of Automation will be "upgraded" to bureau status with an enlarged staff.



Secretary Hodges trains sights on exports, imports

REORGANIZATION of two important sections of the Commerce Department may give Secretary Luther Hodges the policy making role he has sought since entering President Kennedy's administration. Involved are the Business & Defense Services Administration (BDSA) and the Bureau of Foreign Commerce (BFC).

Most important to the secretary is a planned split of the BFC into two sections, one for planning, one for operations. The operations end will include many of the statistical functions and routine jobs of the BFC, including the administration of the Export Control Act.

The new planning end of BFC will be headed by a well known (to metalworkers with overseas interests) executive who has some new ideas for the export expansion program.

Shifts within the BDSA will involve the consolidation of some divisions, but most important, a new marketing and research division will be created to promote industrial growth here at home. In the new setup, the BDSA marketing group and the BFC planning group will be working closely together to develop new approaches to the problem of protecting domestic interests while expanding overseas interests.

BDSA will be streamlined to this extent: Three main divisions will be established along the lines of finished products, raw materials, and other industrial segments. Each major divisional section will report to an assistant administrator of BDSA. In the past, each of the 25 BDSA divisions has reported directly to the administrator.

Observers are enthusiastic about the new planning-marketing section of BDSA, claiming it will give the Commerce Department the sort of "forward looking" role that has been needed for years in an era of exploding technology.

A big new market is born . . .

Sweet Water From Salty Seas

'Can Transform the Way of Living'

In an exclusive interview, Interior Secretary Stewart L. Udall tells STEEL that water desalinization "is one of the keys to solving the nation's water problems"; that it "is one of our most fruitful areas for assistance abroad"; and that "it can transform the way of living for people in areas that suffer from fresh water shortages, of which there are many in this country." He adds:

"By 1970, unless important steps are taken to conserve water and use it more efficiently, more and more communities and industries will face serious water problems."

He points out that we must "first look at the water problem in a rounded way. There is a tremendous amount of water now being wasted. If it were used efficiently, we could double our supply. But that would require much sounder water management." He notes that the U. S. needs to do much more research in evaporation control and water pollution.

"For the long haul," says the secretary, "desalinization is one of the keys to solving the problem. It will be especially important in areas that suffer from brackish water and along the seacoasts. It will play an important role throughout the nation.

"But we have much to learn about the technology of desalinization, just as there is much that we need to know about the basic properties and behavior of water. Private industry has a tremendous role. Its ability to improve methods and bring the costs down to the point where prices will make desalinization economically feasible is the key to the success of the program." Mr. Udall suggests that the "government will act as a midwife" in the birth of an important new industry.

He asserts: "With water shortages of a magnitude that could conceivably restrict our economic growth, we must unrelentingly press for the development of all our available water. Anything less than total development will not be enough."

IN A CHICAGO suburb, a housewife turns the water faucet and gets a mere trickle . . . In west Texas, a rancher, his eyes reddened by heat and dust, squints nervously at vultures over water-starved cattle . . . In Southern California, an entire family is hospitalized with hepatitis; they drank from a polluted stream.

Such things happen in the U. S. every year. They are symptomatic of the nation's shortage of fresh water. In some areas, the problem is 15 or 20 years away; in others, it is urgent now. During 1957, for example, 1000 U. S. communities were forced to restrict the use of water.

Giant New Industry

Many avenues are being explored to solve the water problem—underground storage, education in conservation, more effective controls against pollution, methods for reuse, reclaiming of sewage, evaporation control, even artificial rainmaking. But, over the long pull, the most promising method appears to be tapping potable water from the seas. This field of technology will give birth to a giant new industry.

More than 100 U. S. organizations, and numerous groups abroad, are doing research, developing processes, designing, building, and operating plants for water desalinization. At least $5 million is being spent in the U. S. this year on research and development.

The staff report of the House Committee on Science & Astronautics (submitted to Congress Mar. 10) asserts: "It is likely that the U. S. will be the first of the highly civilized, technologically advanced nations to find itself in real

difficulty due to fresh water shortages; that this difficulty will materialize as much as ten years earlier than the 1980 date set by most prognosticators—that is, by 1970 or before—and that the nature of our water needs will be severe enough to make the conversion of salt water a major commercial venture within 15 or 20 years."

Westinghouse Electric Corp. estimates the market for desalted water at 300 million gallons daily by '70, 600 million by '75, and 1 billion gallons daily by 1980. Bjorksten-Texas Research Co. expects the 1980 figure to be 2 billion gallons daily.

While some researchers brand those figures as "optimistic," even more fantastic predictions are being made. The House committee report contends: "Within 15 years, it is estimated that there will be markets for at least 100 billion gallons of converted water per day, and that during the interim, $10 billion to $20 billion will have to be expended on new conversion plants."

Adds F. W. (Pat) O'Meara, staff director of the Interior Department's Office of Saline Water: "It's conceivable that, by 1980, we'll need 85 billion gallons of converted fresh water per day in the U. S. By then, we'll need about 600 billion gallons of water daily—only 515 billion are available."

Big Market for Metalworking

Even if you accept conservative estimates, this new industry will mean a big new market for a wide range of metalworking plants. STEEL asked 30 firms making conversion equipment what materials and components they will be buying. Among the answers: Stainless steel, Monel, aluminum, Hastelloy, steels clad with noncorrosive metallics and nonmetallics, cupro-nickel alloys, carbon steel (including A-285), copper bearing steels, structurals, steel and nonferrous pipe and tubing (including plastic lined pipe, pumps, valves and fittings), drives, controls, motors, compressors, turbines, tanks, instrumentation, filters, fasteners, evaporators, diesel engines, plates, condensers, gasoline engines, heat exchangers, glass, plastic film, plastic pipe, valves and fittings, and boilers.

As an indication of the size of the market, Weir Chicago Bridge Inc. used 350 tons of steel plates in building a plant which produces 1 million gallons of fresh water daily. Another 100,000-gallon-per-day plant used 8 miles of aluminum tubing and 50 tons of steel sheets and plates.

Why the Market Will Grow

The U. S. will feel the need for salt water conversion because of a combination of trends that strain our present resources—a rapidly growing population, a high standard of living that depends on voluminous water use, swift industrial expansion that not only requires more water but tends to pollute existing resources, and a large part of our terrain that is arid and must have water to be productive.

New household products—dishwashers, automatic washing machines, garbage disposers, swimming pools—are pushing the per capita usage figure upward.

There is also a theory that the U. S. is subject to alternating decades of relative wetness and drought. Within that context, we're in a wet cycle—and will enter a dry cycle in 1971 or thereabout.

Top Export Potential

While the U. S. market for desalinization looms large, it may well be dwarfed by the export market. For example, 60 of the 100 underdeveloped countries associated with the United Nations suffer water shortages that can probably be solved only one way: Salt water conversion. Among areas desperate for water: Israel, Egypt, Iraq, India, Pakistan, Ceylon, Algeria, other parts of North Africa and Latin America. Many islands, such as Bermuda, are perennially or

Water for beverages in Bahrein
Merrill Lynch, Pierce, Fenner & Smith Inc.

periodically faced with water shortages. Western Australia is a virtual desert. Brackish water is a serious problem in parts of Mexico and Argentina. On more than one-third of the earth's land surface, people seldom see a raindrop.

So the U. S. is in a strategic position to reap more than material benefits if we produce the first efficient system for converting sea water to fresh. In an era of rising nationalism and a world in which the majority of nations need water to cultivate their land, feed their industries, and raise the living standards of their people, cheap ways of producing fresh water would be invaluable builders of international good will and prestige.

An investment of, say $6 million, could transform a dry area into a manmade oasis. Such a plant could be a permanent monument to the scientific leadership and good will of the U. S.

Foreign R&D

Studies of salt water conversion have been undertaken in more than 30 countries. Japan is doing considerable work.

Under an Organization for European Economic Co-operation program, eight nations jointly conducted conversion research. Five—the United Kingdom, Netherlands, France, Australia, and South Africa —carried the financial load, while three—Israel, Greece, and Pakistan —contributed knowhow. The program has been completed, and a semiprivate group of conversion equipment manufacturers (International Salt Water Development Group) has grown out of it.

Work on improving solar distillation is progressing in Morocco, Italy, Spain, Australia, and Algeria, as well as the U. S. Solar stills are in use in Malta, Cyprus, Greece, and Algeria.

The Cost Trend

The cost trend is encouraging. Only a decade ago, $5 was about the minimum cost per 1000 gallons of converted fresh water. Today, costs range from around $1.75 per 1000 gallons to less than $1—depending on size of plant, salinity of the water, and cost of power. Industry authorities are projecting costs of 30 to 70 cents for 1965.

In some areas, the water shortage is so severe that conversion is practical at costs above $1 per 1000 gallons. But for widespread use, the costs would have to be brought below 50 cents. Success seems likely. A STEEL survey finds many firms in the field suggesting costs of 40 to 50 cents per 1000 gallons for 1965. Bjorksten-Texas Research Co. says "a realistic goal for 1965" is 30 cents. Food Machinery & Chemical Corp. expects to drive costs down to 40 cents per 1000 gal-

How Much Water Do We Need?

The amount of water used daily in the U S. would stand a foot deep over all of Rhode Island. Use has soared from 40 billion gallons daily in 1900 to around 320 billion today—and will exceed 450 billion by 1975. Here are some typical requirements . . .

32,000 gallons per ton of steel ingots.

30,000 gallons per ton of primary aluminum.

3,750 gallons per pound of beef.

37 gallons per slice of bread.

660,000 gallons per ton of synthetic rubber.

240,000 gallons per ton of newsprint.

250 gallons daily per bed in hospitals.

120,000 gallons daily per office of 4000 persons.

550 gallons daily per family of four for household uses.

200,000 gallons to produce a ton of rayon fiber.

7 gallons to produce 1 gallon of gasoline.

15 gallons to produce one serving of potatoes.

236 gallons to produce a gallon of alcohol.

The above numbers are averages. Usage varies greatly. Example: The production of 1 ton of steel can take up to 70,000 gallons of water.

Household desalting in Texas
American Machine & Foundry Co.

lons by 1965. At that cost, it forecasts a $2 billion annual equipment market in the U. S., plus a $500,000 export market. W. L. Badger Associates Inc., predicts a cost of 40 cents per 1000 gallons by '65, sees a domestic market to convert 100 million gallons daily by then, plus an export market of 1 billion gallons per day.

From conventional sources, water for irrigation purposes costs 10 to 15 cents per 1000 gallons. For municipal and residential uses, the cost runs from 20 to 45 cents per 1000 gallons. For industrial purposes, the cost may be low, if its only purpose is cooling, or considerably higher (50 cents to $1.50) if high purity is necessary. But most contemporary water supply systems are old and reflect original costs that are considerably below today's cost of developing new sources.

Technology Improving

Salt water conversion is older than the teakettle. Aristotle taught that "salt water when it turns into vapor becomes sweet." Egyptians carried water from the river in camel skin bags and transferred it to earthern jars, then crushed sweet almonds and plunged them up and down in the water to clarify it. Sanskrit lore dating from about 2000 B.C. advises that "foul water" may be improved by "boiling and dipping seven times into a piece of hot copper," then filtering it. Thomas Jefferson, while secretary of state, gave Congress a report on sea water conversion.

In water-short areas abroad, sea water desalting plants date back as far as 1728. It has been a growing business since the 1940s. Aqua-Chem Inc., a pioneer in the field, has built more than 4000 units—many for shipboard use. Government sources report that overseas conversion capacity already exceeds 30 million gallons daily. Westinghouse Electric Corp. has installed a daily capacity of 5.2 million gallons in the Kuwait area alone.

With the spur of federal funds, technology is improving rapidly. The Office of Saline Water, established in 1952, has been budgeted $10 million for research and $10 million for the construction of demonstration plants. It's likely that more money will be forthcoming. As Mr. O'Meara puts it: "It's ridiculous that we should try to operate on roughly the same amount of money as the Washington Zoo."

The Office of Saline Water has sponsored extensive research on conversion methods as well as related problems like corrosion, heat transfer, scale prevention and removal, membranes, and the basic chemistry of water.

Basically, there are only two ways to make salty water sweet: 1. Take the water out of the salt. 2. Take the salt out of the water. Using the first approach, most companies are concentrating on variations of two methods—distillation and freezing.

The majority of work employing the second approach has been in electrodialysis.

Work is also being done on vapor, ion exchange, hydrates, and osmosis systems.

At least five companies are studying household units. American Machine & Foundry is test marketing a unit (see photo on Page 43). Aquastills is marketing a machine to convert 500 gallons per day. It uses 55 to 75 kw-hr of electric current to turn out 1000 gallons.

STEEL will supply, on request, a bibliography of technical reports.

A Victory for Humanity

It will be a major victory for the forces of democracy, and for all humanity, if the U. S. rapidly puts itself in a position to export low cost conversion units to the arid regions of the world. We would win the gratitude of the uncommitted and newly developed nations, contribute immensely to an expanding world economy, and gain both in prestige and material values.

Practical salt water conversion means the ability to reclaim lost areas for agriculture and to attract industry into new regions. It offers a growth opportunity to communities that are now stifled by water shortages. For industry, it means an expansion of available locations, the attainment of reliable water supplies for numerous new processes, and the opening of a giant market for equipment around the world.

Says David Karr, president, Fairbanks Whitney: "This generation will be remembered for turning the sea into a well that never runs dry."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Who's Who in Conversion?

At least 50 U. S. firms are actively engaged in research, development, or production in the salt water conversion industry. An additional 30 or more universities, research organizations, and individuals are doing research. Among the important companies active in the field:

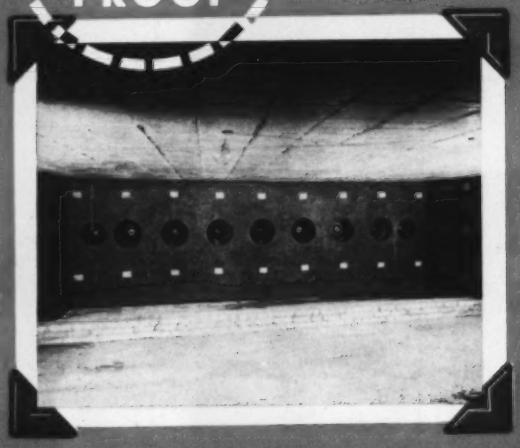
American Machine & Foundry Co.'s Maxim Div., New York; Aqua-Chem Inc., Waukesha, Wis.; Aquastills Inc., Rochester, N. Y.; Austin Co., Cleveland; Babcock & Wilcox Co., New York; Badger Mfg. Co., Cambridge, Mass.; Badger (W. L.) Associates Inc., Ann Arbor, Mich.; Battelle Memorial Institute, Columbus, Ohio; Bjorksten-Texas Research Co., Houston; Blew-Knox Co., Pittsburgh; Carrier Corp., Syracuse, N. Y.; Catalytic Construction Co., Philadelphia; Cooper-Bessemer Corp., Mt. Vernon, Ohio; Cornell University, Ithaca, N. Y.; Curtiss-Wright Corp.'s Princeton (N. J.) Div.; Dow Chemical Co.'s Texas Div., Freeport, Tex.; E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.; Electric Storage Battery Co.'s Yardley, Pa., research center; Fairbanks, Morse & Co., Chicago; Ferguson (H. K.) & Co., Cleveland; Fluor Corp., Los Angeles; Food Machinery & Chemical Corp., San Jose, Calif.; Franklin Institute, Philadelphia; General Electric Co., Schenectady, N. Y.; Georgia Institute of Technology, Atlanta; Grace (W. R.) & Co.'s Research Div., Clarksville, Md.; Griscom-Russell Co., Massillon, Ohio; International Nickel Co. Inc., New York; Ionac Chemical Div., Birmingham, N. J., Pfaudler-Permutit Inc.; Ionics Inc., Cambridge, Mass.; Kellogg (M. W.) Co., New York; Koppers Co., Pittsburgh; Little (Arthur D.) Inc., Cambridge, Mass.; Lummus Co., New York; Monsanto Chemical Co., St. Louis; North American Aviation Inc.'s Rocketdyne Div., Canoga Park, Calif.; Radiation Applications Inc., New York; Resources Research Inc., Washington; Scientific Design Co. Inc., New York; Southern Research Institute, Birmingham; Southwest Research Institute, San Antonio, Tex.; Stearns-Roger Mfg. Co., Denver; Struthers Wells Corp., Warren, Pa.; Aeronautics Div., Dallas, Chance Vought Corp.; Weir Chicago Bridge Inc., New York; Whiting Corp., Harvey, Ill.

HERE'S UNRETOUCHED PROOF

. . . in rail and billet reheating furnace at

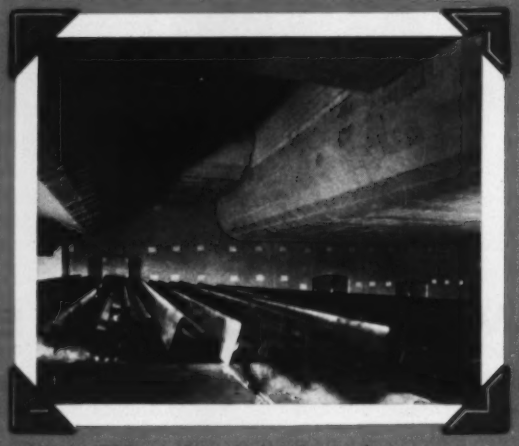
INLAND STEEL

Plibrico plastic refractory lining shows how it can take punishment



APRIL 1960 . . . view shows front burner wall of rugged, shock-resistant Plibrico Super "F".

TODAY . . . unretouched photograph of same area shows how Plibrico Super "F" withstands punishment in this high heat zone.



APRIL 1960 . . . view at charging end shows sidewall and flared doors also formed with Super "F", a grade for high heat conditions.

TODAY . . . unretouched photograph illustrates Plibrico's tight, stable monolithic lining of Super "F" after almost one year in service.

PLIBRICO OFFERS A WIDE SELECTION of plastics, castables, gunning and ramming mixes formulated to give you exactly the properties and characteristics you need. Get complete data on Plibrico products and their advantages from your local Plibrico man.

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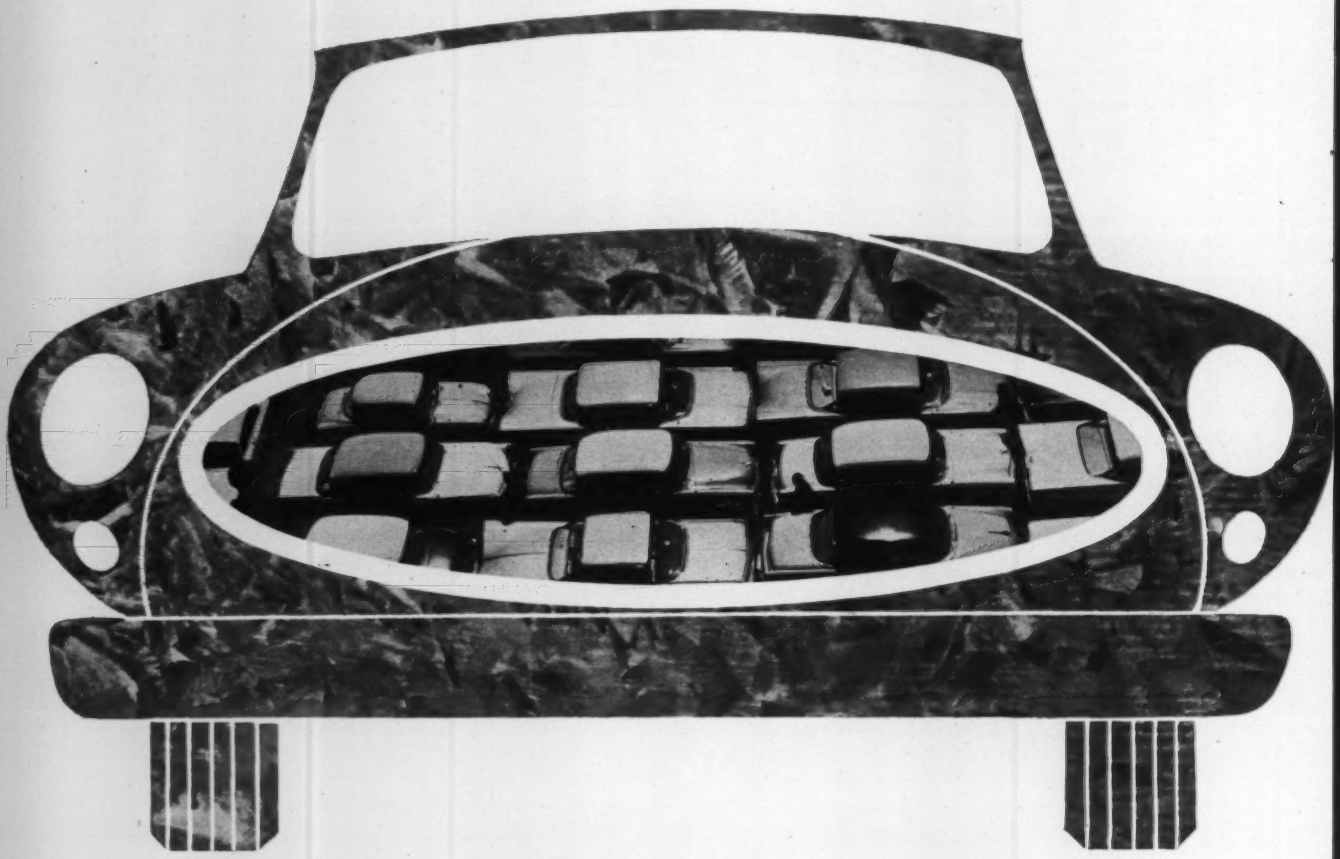
CATALOGS 68 & 71 cover plastics, ramming mixes and castables giving advantages and applications.

More parts in more new cars fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

In 1960 the Motor City consumed a massive 218,964 net tons of galvanized steel sheets to fight car corrosion. That's 38% more than was used in 1959 and over 700% more than in 1954.

In the average compact car, for instance, Detroit now uses over 100 pounds of corrosion-resistant galvanized steel sheets. The results are numerous and notable: Car owners are getting greater durability and a sharp drop in maintenance costs and headaches. Manufacturers are getting the cost reductions inherent in galvanized steel's simplified fabricating procedures. Head and tail lamp housings, for instance, formerly required five or six steps when zinc plated or painted after stamping. Now they are moved direct from press to assembly line with their tight zinc coatings completely undamaged by fabrication. The same economies apply to side members, rocker panels, front and rear rails and cross members.

WEIRKOTE,® IN PARTICULAR! Widely used Weirkote is a natural for automotive applications, and the auto industry has been quick to put it to extensive use. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection that can be worked to the very limits of the steel base without chipping or peeling. This superior product is the end result of years of experience and technical research devoted to coating steel sheets with zinc. Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
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Divisions of
NATIONAL STEEL CORPORATION

Autodom's Challenges in the '60s —No. 4

Last in a series, this article points up the marketing challenges automakers face in the next decade.

Marketing Executives Set Their Goals

Wants to satisfy customer demands . . .

THE CHALLENGE the automobile industry faces in the next ten years is a continuation of the same forces we have perceived in the past.

As this country's highway system progresses and urban development continues, the needs of our residents must be geared more and more to extreme mobility. Personalized transportation will become increasingly vital. There will be a need for more than one car in many families.

The buying trend caused by those factors should continue at an increasing rate.

It is anticipated that gross national product will increase by 40 per cent to surpass $700 billion by the end of the decade. Spendable income is likely to grow by more than 15 per cent. The population should increase by 33 million with more families moving to suburban areas. By the end of the period, annual automobile sales should exceed 8 million with vehicle registrations 36 per cent above today's level.

The challenge to the industry is to anticipate and satisfy increased customer demand through a quality dealer organization and to sell and service products efficiently in the expanding market.

JAMES M. ROCHE
Vice president-distribution
General Motors Corp.

Sees more models—shorter model runs . . .

ALTHOUGH the change is not abrupt, we already have observed signs of a growing demand for variety and quality in the automobile market place.

I believe the key to selling cars and trucks in the 1960s will be flexibility in meeting a changing market and success in achieving new levels of quality.

There has been a wide awareness that the "war babies," now becoming consumers in their own rights, guarantee an expanding market. But just as important is the double multiplier: Customers of the 1960s will not only be more numerous, but more prosperous.

The customer with a rising level of income is more demanding, more knowing. He wants greater variety available to let him express his individuality.

The growing demand for variety and quality will make itself felt at both the manufacturing and retailing ends of the automobile business.

First, I believe the size of dealerships will increase. It's a simple matter of arithmetic. While average annual retail passenger car sales are expected to rise to about 7 million units by 1970, we do not expect a commensurate increase in

CHARLES R. BEACHAM
Vice president-marketing
Ford Motor Co.

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the number of dealers.

Second, there seems to be a trend toward dealers handling a complete range of price lines. Because we believe the franchise system will continue, each manufacturer or each automotive division will tend to produce a more complete price line. However, due to more proficient market forecasting, more efficient scheduling, and faster delivery, I believe dealers will be able to maintain their present inventory levels in spite of greater volume and more complete product offerings.

For the manufacturer and its suppliers, the impending changes in car marketing mean new emphasis on speed, flexibility, and new products. Because of the rapidity of change, there are likely to be shorter model runs, but greater opportunity for new techniques and new materials.

Claims compacts will dominate market . . .

ROY ABERNETHY
Executive vice president
American Motors Corp.

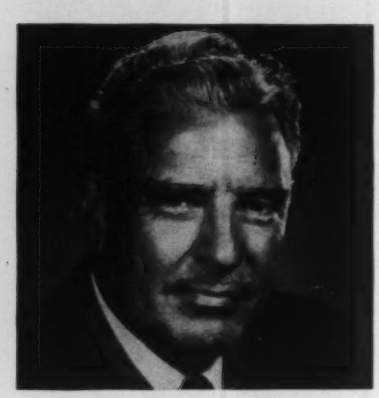
MARKETING automobiles during the 1960s will call for sound judgment as the compact car market continues to expand and eventually dominates the market place. We will see a shift in marketing techniques and approaches as compact car competition heightens. The balance between family size interior room and comfort, sensible performance, and over-all economy will be the keynote of car marketing.

Emphasis will also be placed on the functional aspects of the automobile, such as ease of handling, parking, and maneuverability. Car appearance and styling will continue to be important factors but the real consideration will be on consumer benefits and real improvement in the product. Another selling point—product quality—will continue to be improved and stressed to a greater degree.

Sales training programs will be geared to educate the consumer on the need for styling stability to improve product quality and develop greater automobile safety and longer life.

Dependable dealer service and training service personnel will become an increasingly important adjunct of marketing plans.

Charges old marketing goals are reversed . . .



LEWIS E. MINKEL
Vice president-marketing
Studebaker-Packard Corp.

THE AGE OLD GOAL of marketing has been reversed in the automobile field. Formerly, the goal was to sell what was made. Today, we must make what will sell.

Cars and trucks designed to meet changing social conditions and the utilitarian needs of specific population groups will be the most significant marketing development during the coming decade. The change began with the compacts. It will gain momentum.

Formerly, the automobile was a luxury and a status symbol. Now, it's a necessity for most people. Almost every activity in daily life (from drive-in restaurants to drive-in banks) has been adapted to serve the motorist while public transportation facilities have declined. In addition, the tremendous growth of recreational products and services is competing with the automobile for the consumer dollar more strongly than ever before.

Meanwhile, the "population explosion" will be occurring. Teen-agers will require cars for attending school. Young married couples will need cars for suburban living. As children grow up, families will increasingly require two, three, or more cars.

The decade of the '60s will see a closer alliance between manufacturers and their dealers in providing maximum service at the lowest possible cost.

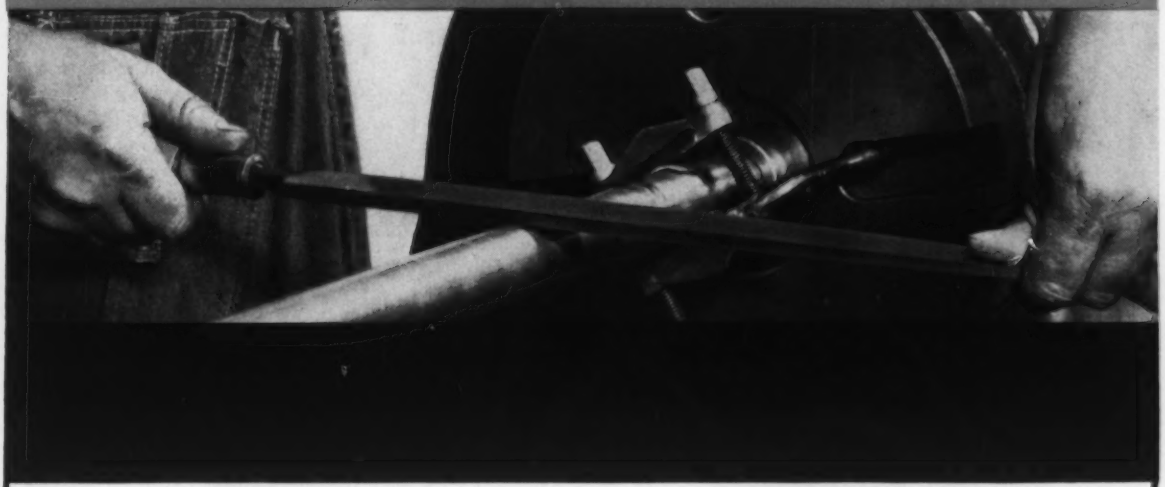
U. S. Auto Output

Passenger Only	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	559,474	613,136
July	402,400†	434,377
7 Mo. Totals	3,139,117	4,243,871
August		305,514
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108

Week Ended	1961	1960
July 1	125,297	125,868
July 8	85,889	89,769
July 15	127,157	105,113
July 22	102,875	112,179
July 29	75,235†	107,019
Aug. 5	35,000*	103,504

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Everything's shop shape...



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The better design of Fellows cutters is the result of advanced engineering techniques, including the use of a high-speed computer for solving design and application problems. Their better quality is the result of constant advances in metallurgy and manufacturing methods. And, proof of their better performance are the thousands of Fellows cutters in use on modern gear production lines.

Fellows cutters on Fellows machines lower costs and speed production on external and internal, spur and helical involute gears and a wide variety of non-involute shapes as well. All Fellows Offices are at your service for providing information.

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THE PRECISION LINE **Fellows** *Gear Production Equipment*

Needed: More Consumer Spending

THE GROUNDWORK is laid for a vigorous charge into record high economic territory in the late third and early fourth quarters. It's up to the consumer now. He will have to exercise more of his purchasing power than he has so far in the recovery period.

• **Where We Stand** — Although some businesses—especially in metalworking—have not felt the uptrend as much as others, even the most pessimistic observer has to admit that the over-all economy has climbed up to the record level of early 1960. The Federal Reserve Board's industrial production index was at 110 (1957=100) in June, and the smart bettors say that July's figure is at least as good—maybe a point better.

The President's Council of Economic Advisers says that the gross national product in the second quarter stepped up to an annual rate of $515 billion compared with $500.8 billion in the first quarter. Every major component except net exports contributed to the gain.

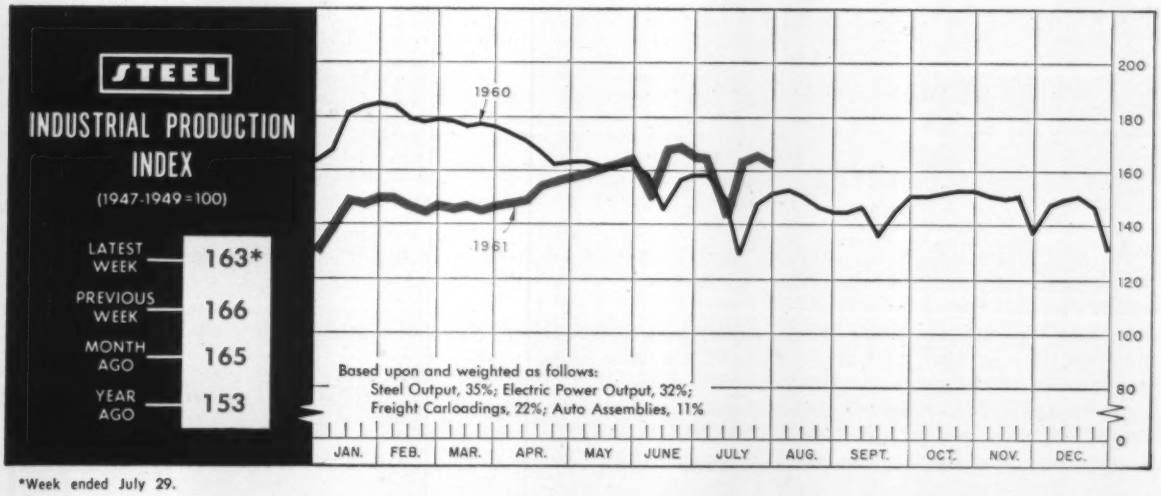
Several other indicators of the total business position are at previous highs, but there is a strong suspicion, supported by some reliable statistics, that the consumer is not contributing as much as he might in this recovery—especially in regard to durable goods.

• **Purchasing Power at Peak** — There still seems to be a feeling of uneasiness about the immediate future. Also, the consumer may be changing his spending pattern. There is little question that he has the buying power to trigger a full fledged boom. Personal income in June was at a record annual rate of $416.7 billion. It undoubtedly advanced again in July.

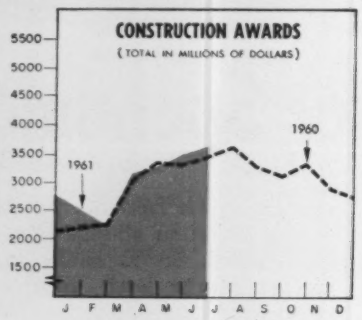
Net spendable earnings also reached record levels in June, climbing to $83.74 a week for a production worker with three dependents. That is 2.5 per cent higher than the year-ago month. In addition, buying power has climbed almost 2 per cent because of nearly stable prices in the same period. Both hourly wages and the workweek are climbing, so unless runaway inflation sets in this fall, the worker's financial position should improve further.

• **Liquid Position** — Further evidence that spending is not as great as it might be expected to be in a recovery is the fact that personal savings are at an all-time high of $25.7 billion, up $2 billion from the first quarter level. And consumer credit has been lagging. Total outstanding credit of $54.4 billion in May had barely regained a not too satisfactory February position. The main category—installment credit—was still below the February level. Part of the lag can be traced to only moderate auto sales during the first half. Combining rising income, record savings, and available credit, the consumer is in a better position to buy now than at almost any other time in recent years.

• **Freezing the Assets**—But government figures show that consumer spending generally is picking up slower than other areas of the economy. Says the Office of Business Economics (OBE), Department of Commerce, in the July *Survey of Current Business*: "The principal weakness (in demand for final products) has been in consumer demand for durable goods, and here an appreciable rise in total purchases has occurred since the beginning of the year . . . In relation to income, however, retail sales

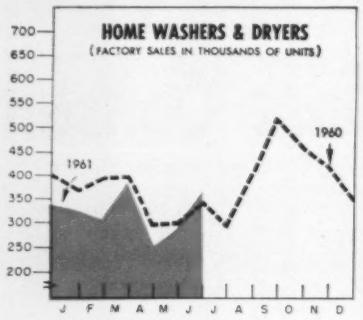


*Week ended July 29.



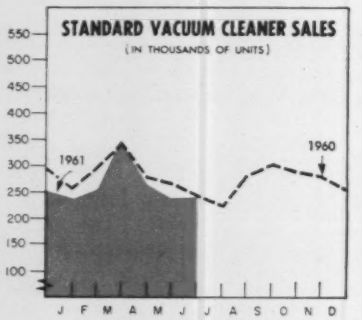
	Total		Building	
	1961	1960	1961	1960
Jan.	2,485	2,193	1,787	1,728
Feb.	2,235	2,240	1,674	1,685
Mar.	3,166	3,046	2,398	2,361
Apr.	3,297	3,360	2,504	2,527
May	3,501	3,337	2,658	2,563
June	3,602	3,472	2,779	2,593
July	....	3,597	....	2,481
Aug.	....	3,295	....	2,550
Sept.	....	3,119	....	2,402
Oct.	....	3,319	....	2,555
Nov.	....	2,886	....	2,169
Dec.	....	2,718	....	1,872
Totals	....	36,318*	....	27,345*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.



	Washers		Dryers	
	1961	1960	1961	1960
Jan.	228,919	254,565	103,158	111,603
Feb.	227,562	283,640	81,310	108,367
Mar.	305,590	305,635	82,093	90,205
Apr.	209,695	235,828	46,042	53,213
May	247,904	243,943	42,672	53,700
June	304,295	276,955	60,705	64,950
July	.....	217,700	.....	72,600
Aug.	.....	296,500	.....	105,100
Sept.	.....	352,700	.....	165,500
Oct.	.....	305,800	.....	151,900
Nov.	.....	275,300	.....	142,000
Dec.	.....	223,500	.....	119,200
Totals	.....	3,272,066	.....	1,238,338

American Home Laundry Mfrs. Assn.



	1961	1960	1959
Jan.	242,515	258,330	242,516
Feb.	257,930	294,483	271,396
Mar.	349,972	339,918	346,557
Apr.	265,032	278,391	317,402
May	240,866	265,556	257,345
June	242,001	245,790	275,974
July	....	223,008	221,232
Aug.	.....	280,575	268,165
Sept.	.....	301,935	305,096
Oct.	.....	290,059	330,899
Nov.	.....	280,550	290,130
Dec.	.....	254,631	293,818
Totals	.....	3,313,226	3,420,830

Vacuum Cleaners Mfrs. Assn.
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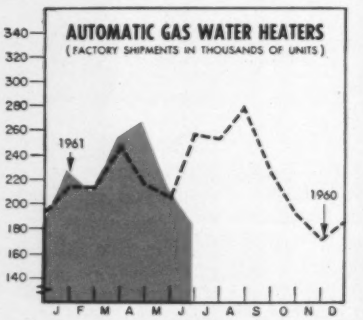

	Shipments—Units		
	1961	1960	1959
Jan.	229,300	215,500	266,200
Feb.	210,400	214,800	259,700
Mar.	255,000	247,300	265,900
Apr.	268,300*	216,200	261,300
May	215,600*	205,500	239,300
June	185,200*	256,000	250,000
July	.....	254,100	245,100
Aug.	.....	279,400	256,100
Sept.	.....	227,600	243,800
Oct.	.....	192,900	274,200
Nov.	.....	171,400	199,100
Dec.	.....	185,500	192,900
Totals	.....	2,666,200	2,953,600

*Preliminary.
Gas Appliance Mfrs. Assn.

have been lagging recently . . . sales by dealers of autos, furniture and appliances, building materials, and hardware are currently lower than they were a year ago . . . Sales of nondurable goods stores in 1960 and thus far in 1961 have not continued the growth shown in prior years; they have held within the narrow range of $12.3 billion and $12.6 billion on a seasonally adjusted basis over the last 12 months.

"Consumer expenditures for services have been rising steadily at a rate sufficient to maintain total consumer buying of goods and services fairly well in line with income changes," OBE concludes.

Stocks Climbing Slowly

About $6.5 billion of the $14.2 billion rise in the gross national product in the second quarter was accounted for by a reversal in the inventory trend. It went from a decumulation rate of $4 billion (annually) in the first quarter to an accumulation rate of $2.5 billion.

But it is difficult to pinpoint that change on an individual or industry-wide basis because businessmen still declare they are being conservative on stocks. STEEL's quarterly surveys of components and raw materials have consistently shown a lack of interest in rebuilding inventories. And the July survey of the National Association of Purchasing Agents reveals an "amazing resistance to inventory accumulation." Sixty per cent of the respondents reported stocks the same as they were in June, while 26 per cent reported lower levels.

Construction Contracts Up

Still one of the brightest spots in the economic picture is the construction industry. Housing starts and total construction activity have swung upward, and F. W. Dodge Corp. reports that contracts for future construction rose to $3.6 billion in June, up 4 per cent from the year-ago month. (See graph and table, at left.) Nonresidential and residential contracts accounted for the gain as heavy engineering fell behind the 1960 pace. For the year to date, nonresidential leads the corresponding 1960 total by 3 per cent; residential by 2 per cent; heavy engineering by 7 per cent. Total construction contracts so far this year lead the 1960 figure by 4 per cent.

However, it should be noted that the weekly construction contract statistics gathered by *Engineering News-Record* show the 1961 cumulative total lagging the year-ago figure by 2 per cent. But the two sources are not exactly comparable. *EN-R* is more concerned with heavy construction, such as public works, mass housing, and commercial and industrial buildings.

Not All Share Equally

One of the most noticeable characteristics of the recovery is the lack

of uniformity among industries. A recent sampling of the reports shows:

• *Used Machine Tools* — After reaching the year's low point in May, June showed up as the best month since January, says the Machinery Dealers National Association. Sales were 115 per cent of those in the 1957 base period.

• *Furniture* — Although June brought no relapse, declares the National Association of Furniture Manufacturers Inc., nothing appeared to encourage members. Orders and employment rose a mere 1 per cent while shipments and payrolls stood still. Compared with the first half of 1960, most aspects of the business are still between 10 and 15 per cent behind.

• *Industrial Furnaces* — For the second consecutive month, orders for industrial furnaces reached the $9 million mark, reports the Industrial Heating Equipment Association Inc. June orders (worth $9,194,000) were 117 per cent ahead of the June, 1960, level.

• *Water Heaters* — Following an encouraging spring buildup for the home construction industry, factory output of gas hot water heaters dropped significantly. June shipments were only 185,200 units compared with the year-ago total of 256,000, says the Gas Appliance Manufacturers Association. However, year-to-date total for 1961 is still 13,300 units ahead of the corresponding 1960 total.

• *Laundry Appliances* — However, June was a good month for the laundry appliance industry. (See graph and table, Page 52.) Total sales were up 25 per cent from May and 7 per cent from June, 1960, states the American Home Laundry Manufacturers' Association.

• *Cleaners*—Producers of vacuum cleaners did nearly as well in June as in the corresponding month of last year, reports the Vacuum Cleaner Manufacturers Association. (See graph and table, Page 52.) But for the year to date, 1961 still lags 1960 by 5 per cent.

• *Business Failures* — Data from Dun & Bradstreet Inc. do not reflect recovery.

It reports the weekly average so far in 1961 is 342 failures compared with only 297 a year ago. Failures in the latest week (ended July 20) exceeded the average by one firm. (See Barometers of Business below.)

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,790[1]	1,818	1,537
Electric Power Distributed (million kw-hr)	15,950[1]	15,829	15,157
Bituminous Coal Output (1000 tons)	7,790[1]	7,440	7,964
Crude Oil Production (daily avg—1000 bbl)	6,950[1]	6,948	6,821
Construction Volume (*ENR*—millions)	$399.7	$509.5	$365.5
Auto, Truck Output—U. S., Canada (*Ward's*)	100,873[1]	129,506	131,520
TRADE			
Freight Carloadings (1000 cars)	590[1]	584	614
Intercity Truck Tonnage (changes from year ago)	+0.8%	+0.6%	−1.2%
Business Failures (Dun & Bradstreet)	343	304	259
Currency in Circulation (millions)[2]	$32,476	$32,634	$32,041
Dept. Store Sales (changes from year ago)[2]	+2%	+3%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,580	$30,130	$26,123
Federal Gross Debt (billions)	$289.7	$289.2	$288.9
Bond Volume, NYSE (millions)	$36.1	$31.5	$22.7
Stocks Sales, NYSE (thousands of shares)	17,360	13,552	13,864
Loans & Investments (billions, adjusted)[3]	$112.9	$112.4	$106.6
U. S. Govt. Obligations Held (billions)[3]	$31.9	$31.5	$27.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.1	224.4	233.2
All Commodities[6]	118.6	118.5	119.5
Commodities Other than Farm & Foods[6]	127.5	127.5	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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The investment casting process allows a new *freedom of design* . . . in shape . . . in materials. You can now design for function—the way you want the part!

This functionally designed instrument chassis was poured as an investment casting without design compromise. Dozens of expensive and complicated machining operations would otherwise have been required. Check your design with Hitchiner—in many cases you can buy *just what you want.*

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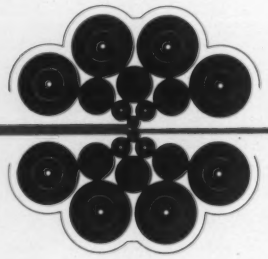
Milford 1, New Hampshire

Report:

THIN GAUGE TINPLATE



How Sendzimir Mills help you compete in this growing market at an extra profit per ton

The growing market for thin tinplate below .008" thickness presents tinplate producers with both a problem and an opportunity.

The problem is not only to gain extra capacity for rolling these new gauges, but to achieve three other benefits:

a — reduce the normal production losses of lowering the finish gauges on present tandem equipment

b — eliminate the additional downtime of extra roll maintenance

c — provide the flexibility to take short runs

THE ECONOMICS

From a profit standpoint, thin gauge tonnage can be best achieved by combining present tandem facilities with a Sendzimir Mill. The tandem mill will roll approximately double the thickness required and supply coils to the Sendzimir Mill for single pass rolling to finished gauge. This provides an immediate tonnage gain from the tandem mill, since the finishing is on the separate Sendzimir Mill and eliminates the tonnage loss from lowering finish gauge on the tandem mill. Thus rolling time will be made available for the finishing of heavy gauge tinplate by the tandem mill.

SHORT-RUNS

Beyond the profit possibilities in producing thin gauge tinplate, the tandem and Sendzimir combination offer other production benefits.

You get the flexibility to make short runs with minimum interference to production on either coated tinplate, annealed or full hard black-plate. Actually, the Sendzimir Mill can make short runs of any low carbon steel rolled on the tandem mill and do it at a profit.

HOT MILL BENEFITS

Finishing lighter gauges on the tandem mill normally require lighter starting gauges. But with the Sendzimir Mill available, the hot rolled coils to be run at semifinished gauges can be substantially heavier, thus increasing production off the hot mill.

INSTALLATION AND OPERATING COSTS

The compact Z-Mill permits low foundation and installation costs. Less building area is needed. The small work rolls of the Z-Mill are replaced in seconds, reground faster on smaller grinders, handled easily. Downtime is reduced, operating efficiency is higher.

FINISHED PRODUCT

The Sendzimir Mill adds to your capacity a product quality unmatched by any other rolling system.

Strip flatness is maintained by adjustment of mill shape through the power crown control while the mill is operating. Strip edge pressure is controlled by lateral adjustment of the tapered intermediate rolls.

It is never necessary to compromise on surface quality because freshly ground work rolls are inserted so readily that consistently superior strip finish can be attained.

Because the smaller work rolls respond more readily to gauge adjustments, gauge is held more accurately and heavy ends can be brought into tolerance for an increase in yield.

PROOF

For a specific proposal of the way these benefits can be applied to your own mill operation, write or telephone Rolling Mill Machinery Sales. Phone Browning 2-3271, DDD Code 203.

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H. Z. CARTER
Avondale Shipyards pres.

NICHOLAS DYKSTRA
Mack Trucks president

PHILIP C. SAYRES
Capewell Mfg. president

Rollin M. Russell was elected president of **Acoustica Associates Inc.**, Los Angeles. He joined the firm early this year as executive vice president. Previously, he served as executive vice president of Electronic Specialty Co., and as vice president and group executive for Hughes Aircraft Co.

H. Z. Carter, former executive vice president, succeeds **J. H. Bull** (retired) as president of **Avondale Shipyards Inc.**, New Orleans. **Sam P. Stone**, vice president, was elected executive vice president. **Edwin H. Fletcher**, chief engineer, was promoted to vice president-engineering.

A. A. Krueger was named vice president sales; **R. L. Smirl** vice president-engineering, **Borg & Beck Div.**, Chicago, Borg-Warner Corp.

John H. Kilmer Jr. was elected president and general manager, **Golden-Anderson Valve Specialty Co.**, Pittsburgh.

Nicholas Dykstra was named president and chief executive officer of **Mack Trucks Inc.**, Plainfield, N. J. He was vice president-finance of McDonnell Aircraft Corp., and previously served as executive vice president of Curtiss-Wright Corp.

Merle J. Davis was appointed sales manager, **Anchor Alloys Inc.**, Brooklyn, N. Y.

Maj. Gen. John A. Barclay, who retired in July as the Army's No. 2 missile chief, joined **Lionel Corp.**, Hillside, N. J., as vice president for research and development.

C. Paul Porterfield, former vice president, Method X Div., Firth Sterling Inc., was named director of sales for **Elox Corp. of Michigan**, Troy, Mich.

Carl E. Anderson was elected president and chief executive officer of **E. W. Bliss Co.**, Canton, Ohio. He was director of general management consultation for Ebasco Services Inc.

Philip C. Sayres was elected president of **Capewell Mfg. Co.**, Hartford, Conn., effective Oct. 1. At present, he is administrative vice president of Richardson-Merrell Inc., formerly Vick Chemical. **Staunton Williams** was elected chairman of Capewell, and chief executive officer.

Horace S. Daley was appointed manager, Numerical Control Dept., **Diehl Mfg. Co.**, Somerville, N. J. He was with Walter Kidde & Co. Other appointments to the department: **John J. Callahan**, sales engineer; **George Schmitt**, service engineer. **William T. Volkhardt** joins Diehl as market analyst.

Taylor Fibre Co., Norristown, Pa., named **Richard R. Hydeman** vice president-marketing and engineering. Former vice president-manufacturing, he is succeeded by **Frank P. Kelly**, who was manager of manufacturing at Brown Instrument Div., Minneapolis-Honeywell Regulator Co. **Dr. Fred P. Baughman**

JOHN H. KILMER JR.
Golden-Anderson pres.

C. PAUL PORTERFIELD
Elox sales director

CARL E. ANDERSON
E. W. Bliss president

RICHARD R. HYDEMAN
Taylor Fibre executive

L. P. McALLISTER

W. HARRISON LACKEY

Lukens Steel vice presidents

CARL McKELVY

JAMES E. WIDMAN

Royal McBee executives

succeeds **Dr. Carlisle M. Thacker** (resigned) as technical co-ordinator.

Lukens Steel Co., Coatesville, Pa., elected **L. P. McAllister** vice president-production; and **W. Harrison Lackey** vice president-sales.

Claude W. Mason was made vice president-assistant general manager; and **Frank J. Hoyne** vice president-sales, Mechanics Universal Joint Div., Rockford, Ill., **Borg-Warner Corp. James Peterson** was made assistant general sales manager.

J. Rodgers Hamilton fills the new post of manager of customer technical service for **United States Steel Corp.'s** central operations, Pittsburgh. He was manager of structural, plate, and high strength steel metallurgy.

Alexander H. Reynolds Jr., former treasurer, was elected a vice president of **Leeds & Northrup Co.**, Philadelphia, responsible for long range planning. **Stephen Loidl Jr.** was made treasurer and controller.

Lapointe Machine Tool Co., Hudson, Mass., elected **Joseph P. Crosby** vice president-director of sales. **James W. Dopp** was made vice president-sales. **Mike Fox** succeeds Mr. Dopp as sales manager of the subsidiary, **Lapointe Machine Co.**, also in Hudson. Mr. Crosby will direct sales policies of both companies.

Edward F. Rogers was named assistant superintendent, buttweld tube mill, in the Campbell, Ohio, Works of **Youngstown Sheet & Tube Co. H. James Smith** was made assistant superintendent-production at the Indiana Harbor, Ind., Works.

John S. Kratz was made product sales manager-metallurgical products, Chemical & Metallurgical Div., **Sylvania Electric Products Inc.**, Towanda, Pa., subsidiary of General Telephone & Electronics Corp. Mr. Kratz succeeds **Jerry D. Hix**, resigned.

Carl McKelvy was elected executive vice president, **Royal McBee Corp.**, Port Chester, N. Y. He was senior vice president responsible for production, and research and development. **James E. Widman** was elected vice president-production.

Kaiser Steel Corp., Oakland, Calif., named **Bernard E. Olsen** manager of Latin American sales for the company's first foreign sales office which opened in Buenos Aires, Argentina, Aug. 1.

Mine Safety Appliances Co., Pittsburgh, consolidated divisionalized research activities of the parent corporation and a research subsidiary. **Roger F. Mather** was made director of the newly established corporate Research & Engineering Div. which integrates personnel and facilities of MSA Research Corp., subsidiary. **Dr. W. P. Yant**, formerly in charge of Mine Safety's research activities, becomes research consultant to the president.

Leonard J. Linde was made director of engineering, Industries Group, **Allis-Chalmers Mfg. Co.**, Milwaukee. He was director of engineering services.

William A. Romain was elected president, **Novo Industrial Corp.**, Chicago, and will serve as chief operations and administrative officer. **Walter E. Bronston**, whom he succeeds as president, remains chairman and chief executive officer. Mr. Romain was president of Sherman Products Inc., Detroit.

William V. McRae Jr. was made Eastern regional manager, **Gerber Scientific Instrument Co.** His office is in Washington.

J. RODGERS HAMILTON

U. S. Steel services

ALEXANDER H. REYNOLDS JR.

Leeds & Northrup v. p.

JOHN S. KRATZ

Sylvania Electric div. sales

Gim H. Lee, former production manager of tungsten and molybdenum for Wah Chang Corp., was made vice president - operations, **Metallurgical International Inc.**, Wallington, N. J.

Misco Precision Casting Co., Whitehall, Mich., division of Howe Sound Co., appointed sales managers to head newly formed divisions. **Richard W. Arter** was made sales manager, Airfoil Products; **James H. Boyle**, Special Products; and **Rex Eberly**, Industrial Products.

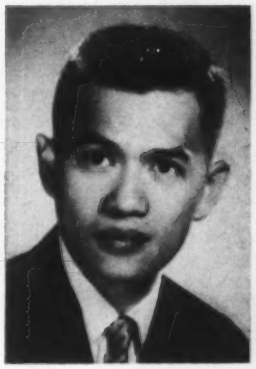
Harry R. Meyer, assistant to vice president - administration, **Lukens Steel Co.**, Coatesville, Pa., was made purchasing agent.

Alonzo B. Kight was elected president of **Borg-Warner International Corp.**, subsidiary of Borg-Warner Corp., Chicago.

Harry L. Benjamin was promoted to vice president-marketing and engineering, **United Aircraft Products Inc.**, Dayton, Ohio. He was assistant to the president.

H. Eugene Crow Jr., former manager of industrial TV development at Dage Div., Thompson Ramo Wooldridge Inc., was named engineering manager of television systems for Kin Tel Div., **Cohu Electronics Inc.**, San Diego, Calif.

H. G. Solbach Jr. was made superintendent-grating manufacture; and **J. S. Murray Jr.** production engineer, Light Metals Dept., in the Engineering Works Div. of **Dravo Corp.**, Pittsburgh. **Charles M. Cooke** was named chief development engineer, air and gas separation, in the Machinery Div.



GIM H. LEE
Metallurgical Internat. v. p.

HARLEY F. GAUKER
Ajax Magnethermic div. post

W. F. SNELLING
North American exec. v. p.

At the Trenton, N. J., Div. of **Ajax Magnethermic Corp.**, **Harley F. Gauker**, former sales manager, Induction Melting Div., was made assistant division manager. **James R. Coley** was promoted from assistant sales manager to sales manager.

Carl A. Odening was named administrative assistant, office of the president, by National Carbon Co., New York, division of Union Carbide Corp. He was director of development.

Earl R. Dew was made sales manager, **L & J Press Corp.**, Elkhart, Ind.

Robert M. Keil was named magnesium mill products manager of **Dow Metal Products Co.**, Midland, Mich., division of Dow Chemical Co. He succeeds **John J. Clemens**, recently made manager of Dow's sales office in Atlanta.

J. B. Komendera was made sales manager, **Mechanical Air Controls Inc.**, Detroit. He was with Valvair Corp.

North American Aviation Inc., Los Angeles, appointed **W. C. Hobbs**, assistant to the senior vice president - administration, a vice president. **W. F. Snelling** was appointed executive vice president, and is succeeded as vice president-manufacturing by **Gary Stroh. William F. Parker**, chief engineer at the Space & Information Systems Div. at Downey, Calif., was named vice president, program management, of the division, heading its Saturn S-II booster proposal effort.

Frederick L. Lindsay was elected president of **Atlantic Stamping Co.**, Rochester, N. Y., to succeed the late **Leonard A. O'Connell. Martin J. Dowling Jr.**, former vice president, becomes chairman.

L. A. Kristoff joined **Alloys & Chemicals Corp.**, Cleveland, as executive assistant. In addition to executive duties, he will head the newly formed Special Products Div.

CHARLES M. COOKE
Dravo development eng.

ROBERT M. KEIL
Dow Metal Products post

J. B. KOMENDERA
Mechanical Air Controls sales

OBITUARIES...

E. P. Hagan, 53, vice president and controller, **Worthington Corp.**, Harrison, N. J., died July 25.

E. C. Erickson, 64, president, **Queen City Cutler Works**, Titusville, Pa., died July 20.

Frank J. Karg, 64, founder and president, **Karg Machine Products Inc.**, Akron, died July 19.

William E. Daley, vice presient, **Sweet's Steel Co.**, Williamsport, Pa., died July 26.

ACME STEEL MACHINES STRAP CIRCLES AROUND ANY OTHER METHOD

In the slit coil field alone, dozens of producers are proving that Acme Steel automatic strapping systems are the most productive partner slitting equipment ever had. For instance, the new F4 Strapping Machine and Indexing Table (at left) let one man completely strap as many as 150 coils *of any width* per hour—all through push-button control. And once secured, coils are unitized just as efficiently with Acme Steel portable powered strapping tools.

Thanks to this rapid, non-stop flow, existing slitting equipment can run *continuously* at full capacity, eliminating the need for investing in additional slitting lines in many instances. No wonder Acme Steel automatic strapping equipment can pay off in 18 months!

No field has a monopoly on these savings. Acme Steel equipment is scoring unparalleled productivity gains in strapping giant hot coils, paper, textiles, products and packages of every description . . . in bundling and unitizing such products as lumber, building materials, bar stock, pipe and sheet metals.

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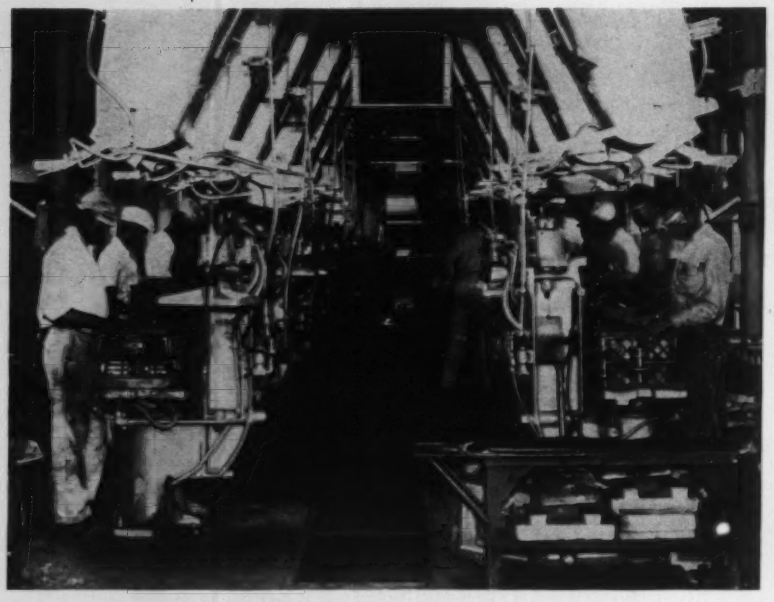


Jolt-squeeze molding stations activated as . . .

International Harvester Opens Nodular Iron Foundry

GROWING IMPORTANCE of nodular iron as an engineering material is demonstrated by the conversion of International Harvester Co.'s gray iron foundry in Memphis, Tenn., to the exclusive production of the newest of the castable irons.

"We have converted a fine gray iron foundry into an even finer nodular iron foundry," says Brooks McCormick, executive vice president. The foundry will produce castings for all International Harvester plants in the three major divisions (Farm Equipment, Motor Truck, and Construction Equipment) and eventually will produce nodular castings for other firms as well.

"We use nodular iron mainly as a substitute for cast or forged steel parts because it costs less, weighs less, and can meet the strength requirements of low carbon and most medium carbon steels," says Mark V. Keeler, vice president, Farm Equipment Div.

• **Output Soars**—International Harvester poured 510,000 lb of nodular iron castings in 1953 and jumped the annual output to more than 19 million lb in 1960. Capacity of the new Memphis foundry is sufficient to give the firm an increase of 36 per cent in production and can be about doubled by the addition of more heat treating facilities.

While the capacity of the foundry is 8500 sand molds and 135 tons of nodular iron per shift, present daily rate of production is 75 tons of iron, melted in the smaller of two cupolas externally cooled by water.

The gray iron castings formerly produced at Memphis were transferred to other International Harvester gray iron foundries.

"Controlled and automatic" best describe the Memphis nodular foundry, says Mr. Keeler. "Automatic controls are built into the mixing of the sand and its delivery to the molding stations, the temperature and moisture content of the hot air blasted into the cupolas, the treatment of base iron by submerged alloys, the cooling time of castings, and the heating and air quenching during normalizing and annealing process," he adds.

The foundry will produce three grades of nodular iron castings, ranging in tensile strength from 65,000 to 100,000 psi and in yield strength from 45,000 to 70,000 psi. Ductility will range up to 25 per cent.

Computer Lab Planned

Computer Dept., Phoenix, Ariz., General Electric Co., is constructing a $1.5 million, 39,000 sq ft computer laboratory at Sunnyvale, Calif. Dr. C. F. Spitzer is manager of the laboratory.

Joins Indian Undertaking

McNally Pittsburg Mfg. Corp., Pittsburg, Kans., has joined with Bird & Co. (Pvt.) Ltd., Calcutta, India, in the formation of McNally-Bird Engineering Co. (Pvt.) Ltd., Kumardhubi, Bihar, India. The Indian company will produce material handling and processing equipment, crushers, screens, speed reducers, belt conveyors, dryers, calcining equipment, coal washing equipment, car handling equipment, and fabricated plate parts. It will also operate as contractors for complete plants based on U. S. design and will supply a wide range of maintenance service to the heavy industries in the Kumardhubi area. Lyle W. Stewart is the acting managing director.

Offers Prepainted Metals

Eastern Products Corp., Baltimore, has established a Metal Finishing Div. to sell prepainted coiled steel and aluminum in a wide variety of gages and widths. Facilities are also available for zinc and phosphate coating and for brass plating. Arthur W. Arendt is sales manager of the division.

Texas Gas Plant Planned

National Cylinder Gas Div., Chemetron Corp., Chicago, will build a $1 million air separation plant on a site adjacent to that of Texas Instruments Inc., Dallas. The plant will have a daily capacity to produce 120 tons of oxygen, nitrogen, and argon in liquid and gaseous forms. Machinery for the plant is being supplied by American Air Liquids Inc., New York.

Crucible Installs Units To Test Space Age Metals

Crucible Steel Co. of America, Pittsburgh, has installed two, vacuum, tensile test furnaces at its Central Research Laboratory to determine strengths of Space Age metals under conditions designed to simulate those hundreds of miles above the earth. The furnaces are a development of High Vacuum Equipment Corp., Hingham, Mass., and are designed for rapidly bringing the sample to desired conditions of vacuum and temperature. Crucible Steel's metal evaluation studies to date involve creep and tensile testing of refractory metals at 3000° F as well as heat treatment at temperatures up to 3500° F at a vacuum from 1×10^{-4} to 1×10^{-5} mm Hg.

Milburn Erecting Plant

Alexander Milburn Inc., Baltimore, will erect a plant in Anne Arundel County, Maryland, containing 19,000 sq ft of manufacturing space and 5000 sq ft of office space. The firm makes welding equipment and electronic control systems.

Schwing Opens U. S. Branch

Schwing-American Corp. has been established at 614 Shaw St., Rockford, Ill., as a branch of Friedrich Wilh. Schwing Co., West German manufacturer of construction equipment. A second and related enterprise, AirWay Concrete Placement Corp., is being set up at the Rockford address. E. A. Hoyum is president of the two firms. Plans call for almost all parts of Schwing equipment to be manufactured in the U. S. within a short time. AirWay Concrete will operate the hydraulic and pneumatic concrete pumping equipment for contractors and engineers on a job basis.

Nooter Boosts Capacity

Nooter Corp., St. Louis, is increasing its shop area and installing heavy duty equipment that will enable the firm to produce pressure vessels weighing up to 250 tons, or twice as heavy as its largest units at present. The $1 million project is slated for completion in 1962. New equipment will include a heavy duty bending roll (capable of cold rolling 3⅝ in. thick plates, or hot rolling 6 in. plates) and a series of heavy industrial cranes. Plant area will be increased 50,000 sq ft.

Acadia Plans to Rebuild

Acadia Mfg. Corp. will erect a 20,000 sq ft plant at White Marsh, Md. The company makes aluminum doors and windows and plans to broaden its line by installation of equipment for fabrication of aluminum siding and awnings. Louis J. Barry is president.

Olin Enlarges Omal Plant

Olin has launched a multimillion dollar expansion program at its Omal, Ohio, aluminum rolling mill. New facilities will include a 66 in. cold rolling mill for producing bright finished sheets. Another mill stand will be added to the present hot strip mill, along with more ingot heating facilities and a new automatic flying shear for cutting plates to length, and auxiliary plate sawing, flattening, and inspection equipment. Some of the facilities will be in operation early next year and all are scheduled to be completed by the end of 1962. The new bright mill and auxiliary equipment will be housed in a 36,000 sq ft building.

Rust to Build Furnaces

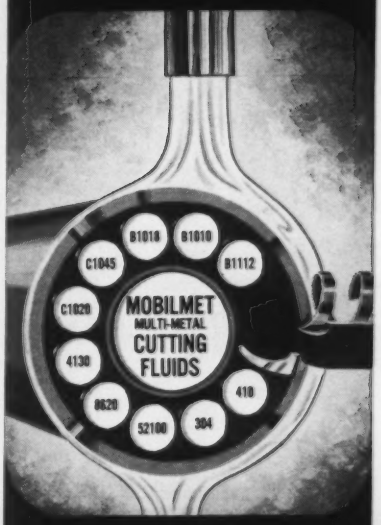
Rust Furnace Co., Pittsburgh, will construct four furnaces for Reynolds Metals Co., Richmond, Va., which will provide a 30 per cent increase in the capacity of the casthouse at the alloy plant in Sheffield, Ala. The furnaces are part of a $2.5 million expansion program. (STEEL, May 29, p. 66.)

Forms British Affiliate

Vulcan-Hart Corp., Baltimore, manufacturer of commercial ranges and kitchen equipment and utensils, has joined in a venture with Brightside Engineering & Foundry Co. Ltd., Sheffield, England, to erect a 100,000 sq ft plant at Sheffield for the production of Vulcan-Hart products. The new unit,

(*Please turn to Page* 64)

SEE AD ON FOLLOWING PAGES...



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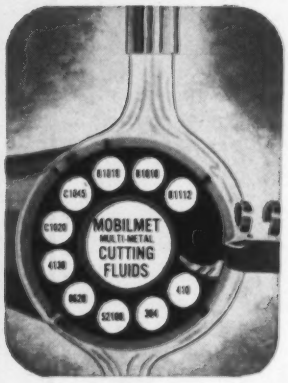
the first multi-metal cutting fluids



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Greater output, lower costs

Due to a unique additive combination, a single Mobilmet oil can be used on both soft, draggy metals and hard, brittle workpieces. As a result, there's less downtime for tool and cutting-oil changes. You get more production from each machine. And you save on handling costs, since you stock fewer oils. The wide range of Mobilmet applications includes: turning, drilling, boring, milling, gear hobbing, shaping and shaving, threading, tapping, pipe threading, surface and internal broaching, thread and form grinding, thread rolling, forming and special automatic screw machine operations.

Superior machining efficiency

In developing Mobilmet cutting fluids, Mobil research engineers made use of this Tapping Efficiency Tester to evaluate Mobilmet machining efficiency. In these tests and in field service on soft, draggy SAE1020 steel, new Mobilmet fluids out-performed cutting fluids designed specifically for this service.

Versatile new cutting oils offer you greater machine output, longer tool life, reduced loss from rejects, exceptionally wide range of applications! Now, after two years of exhaustive research and field testing . . . new Mobilmet* oils—the first multi-metal cutting fluids ever offered to the metalworking industry.

Mobilmet oils are uniquely versatile . . . help simplify your cutting oil requirements because each grade is effective over ranges of metals and operations beyond the capacity of any conventional product. And Mobilmet oils offer you superior machining results as well—in terms of improved finishes, longer tool life, and reduced staining.

Behind this versatility and effectiveness: a new additive combination, developed and patented by Mobil, which is pressure-temperature selective in its activity and—highly effective over wide ranges of cutting pressures and temperatures. For complete information, call your Mobil Representative or use coupon on preceding page.

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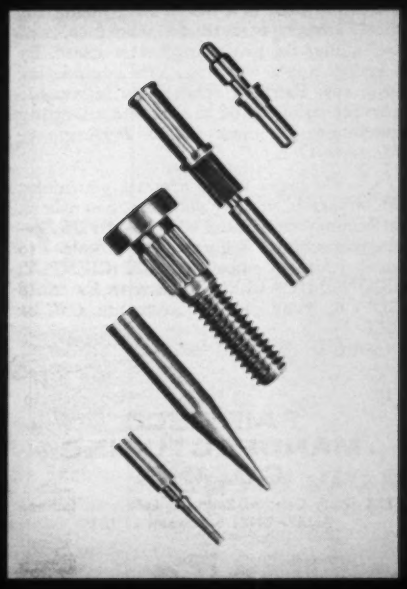
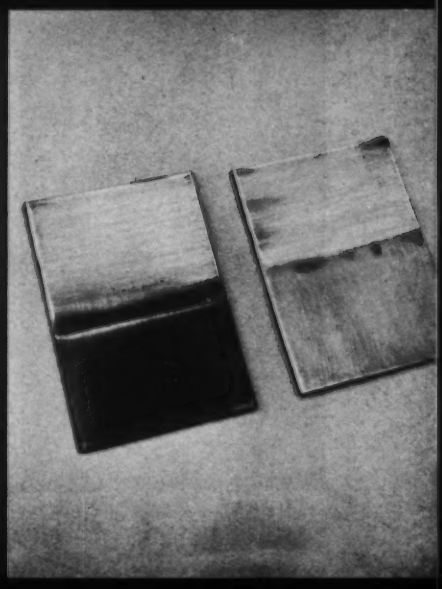
Longer tool life

Protected by heavy-duty Mobilmet, these pipe threading chasers, used for six weeks in moderately severe job-shop service, show little wear on either tool faces or thread crests. Mobilmet oils can mean longer tool life on soft or hard metals.



Fewer rejects

Because Mobilmet oils effectively control built-up edge and tool wear, you get superior finishes—fewer rejects. In some cases, Mobilmet oils reduce the need for additional finishing operations.



Less stain

New additive combination in Mobilmet oils inhibits staining effect. Plate on left was immersed in conventional corrosive cutting oil; plate on right was immersed in heavy-duty Mobilmet suitable for same application. Repolished tops of plates show original condition.

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(*Concluded from Page* 61)

Moorehead-Vulcan Ltd., will distribute the products through the United Kingdom and Africa. Vulcan-Hart also is installing equipment in a 36,000 sq ft addition to its plant in Baltimore.

Armco Gets More Oxygen

Linde Co., a division of Union Carbide Corp., New York, has placed in operation the second oxygen plant at the Middletown Works of Armco Steel Corp. The plant has a daily capacity of 140 tons and boosts Armco's daily supply to 270 tons. The bulk of the oxygen is used in the firm's open hearth furnaces and the balance for such operations as welding, heating, cutting, and scarfing.

CONSOLIDATIONS

Chicago Steel & Wire Co., Chicago, purchased **All West Wire Products Co.**, San Carlos, Calif., and **Advance Mfg. Co. Inc.**, Carlstadt, N. J., and will operate the properties as wholly owned subsidiaries. The parent firm is transferring its executive offices to Columbus, Ohio. Chicago Steel and San Carlos firms make fine steel wire; Advance, aluminum wire.

Robertshaw-Fulton Controls Co., Richmond, Va., has officially acquired the assets of **Lux Clock Mfg. Co. Inc.**, Waterbury, Conn., and will operate the property as Lux Time Div. Arthur E. B. Tanner is managing director of the division; Paul A. Lux, general manager.

Three scrapyards in LaPorte County, Indiana, have merged: **Indiana Salvage Co., Waste Material Corp.**, and **Maple City Steel Supply Co.** Main operating yards of the consolidated firm, American Metals Inc., are on U. S. Route 12, Michigan City, Ind. Officers are: President, Henry Winski; executive vice presidents, Irv Lansing and Nate Winski; vice president-operations, Martin Miller; vice president-Nonferrous Div., Ed Winski; vice president-Foundry Div., Joe Morgan; and secretary-treasurer, Babs Lansing.

JEWELS IN THE SKY—Sapphire windows will protect solar cells from space radiation and permit proposed communication satellites to function for ten years or more. Thousands of solar cells, which convert sunlight into electricity, will power the satellites. They will recharge a battery which serves as a continuous source of power. Platinum sidebars will be brazed to the synthetic sapphire windows, and the platinum will be soldered to a ceramic base. All three materials expand at nearly the same rate, avoiding damage from thermal expansion. The solar cells themselves will be more costly than the sapphire windows, says Bell Laboratories.

CONCRETE GLUE—The Port of Los Angeles eliminated downtime for major pier repairs with an epoxy glue. Liquid resin fills the cracks, then sets up to seal and bond the concrete. In test bars, failure took place through the concrete, not through the resin joint, members of the American Society for Testing Materials were told.

SPACE FUEL FOR SALE—Cesium, a metallic element that may help propel ion engine vehicles through outer space, is being marketed at a purity of 99.9 per cent by Dow Chemical Co., Midland, Mich. Price: $375 a pound in quantities of 1 to 4 lb, $325 a pound for 5 to 9 lb. Dow also sees a large potential market in thermionic converters using cesium plasma.

SATELLITE POWER—Sealed silver - cadmium cells, undergoing evaluation as replacements for nickel-cadmium batteries in solar cell accessory power systems, may give weight savings in satellites. The batteries, developed by Yardney Electric Corp., New York, are being tested by Boeing Co., Seattle. The new batteries are said to have high charge rates at high current efficiencies and deep discharges, even for short cycle applications.

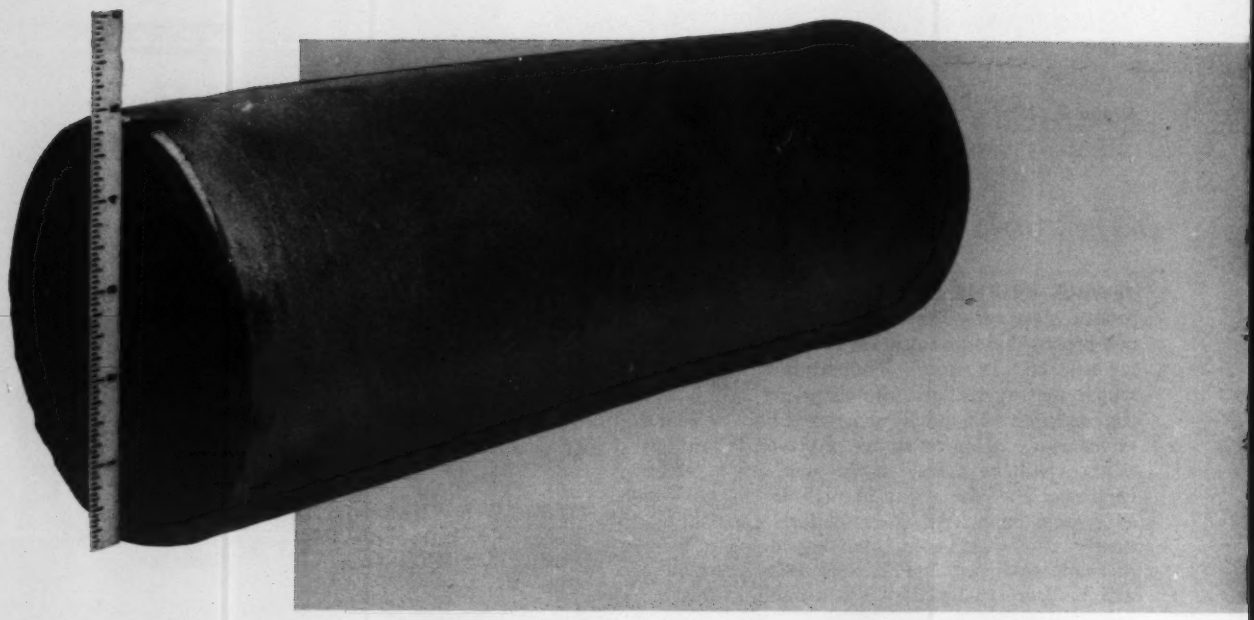
SUPERSONIC TRANSPORT PROBLEMS—William M. Allen, president, Boeing Co., Seattle, cites two technological problems to be solved before supersonic transports are feasible: 1. New types of fuel cells and other nonmetallic items of aircraft equipment will have to be developed to withstand the heat of speeds above Mach 2. 2. The seemingly ever present sonic boom that a supersonic plane pushes ahead of itself across the countryside must be eliminated or modified to permit travel over populated areas.

HYDROGEN PILLS—In industrial and laboratory jobs, where a portable source of hydrogen is needed, a tableted mixture of sodium borohydride and cobalt chloride may be the answer. The tablets react catalytically with water to produce hydrogen. Metal Hydrides Inc., Beverly, Mass., makes them, calls them Hydripills.

COMPUTER TRENDS—Researchers at Westinghouse Electric Corp., Pittsburgh, have revealed: 1. Computer control of electric power generating stations will spark a trend to lighter, smaller generating turbines, since utilization will be more efficient. 2. In 15 years, computers have lowered the cost of making a mathematical calculation by a ratio of 30,000 to 1.

CERAMIC GAGES TO BOOM—Gage elements and wear surfaces are expected to be good markets for ceramics, says M. E. Day, manager, Stupalox Project, Carborundum Co., Niagara Falls, N. Y. Much of the publicity has been given to the use of ceramics for cutting tools, but gage elements aren't to be ignored. Several gagemakers, like Pratt & Whitney Co. Inc. and Greenfield Tap & Die Co. are already out with ceramic fixed gages.

COMPUTER MAKE-BELIEVE—One of the roles for computers is that of simulating complex industrial processes. The computers are set up to simulate equipment or a whole process. Control systems engineers then hook up control equipment to the computers to test it for performance and, in some cases, to debug the proposed control system before it's installed. Westinghouse Electric Corp. uses an analog computer to do the simulating. Bell Telephone Laboratories uses a digital computer for similar purposes.



In handling large pressings, good green strength reduces damage

Higher pressing pressures may not be needed....

Particle Control Beefs Up Compacts

ARNOLD R. POSTER
Chemical & Metallurgical Div.
Towanda, Pa.
Sylvania Electric Products Inc.
Subsidiary of General Telephone & Electronics Corp.

• YOU CAN CONTROL the strength of pressed compacts of powdered metals by controlling particle size, size distribution, and particle shape as well as compacting pressure. Green strength determines your ability to handle the parts before sintering. It becomes particularly important as the size and complexity of powder parts increase and tougher metals are used.

Strength and density are not necessarily equivalent, especially with metals like tungsten. Such brittle materials do not form point welds under pressure as well as more ductile metals. Important variables for tungsten are the interlocking of irregular particles and "interfit"—the ability of finer particles to fill voids between larger ones.

The difficulty of working with tungsten was overcome by special handling methods when the metal was used principally for wire and reduced by swaging. Handling green compacts in volume by mechanical devices increases the danger of damage and calls for a greater understanding of compacting mechanisms.

• The pressing of metal powders requires several stages.

In a section on pressing in *The Physics of Powder Metallurgy*, R. P. Seelig says they occur in this order:

• Bridges formed in mold filling are broken down as initial adhesive forces are overcome; there is considerable movement; and small particles are squeezed into voids. Little deformation of the particles occurs.

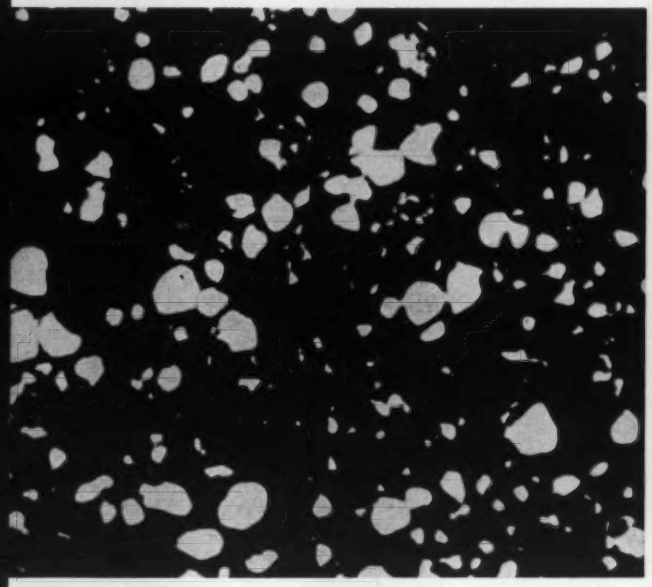
• Deformation starts, and aggregates of particles are formed. Most of the possible movement has occurred, and absorbed energy is used for deformation or taken up by frictional losses.

• Continued pressure overcomes elastic and residual stresses. Contact areas grow; surface irregularities are abraded; oxide and gas films are penetrated. Mechanical interlocking also takes place.

Relationships among those processes depend on the ductility of the particles and their physical nature —size, shape, and size distribution.

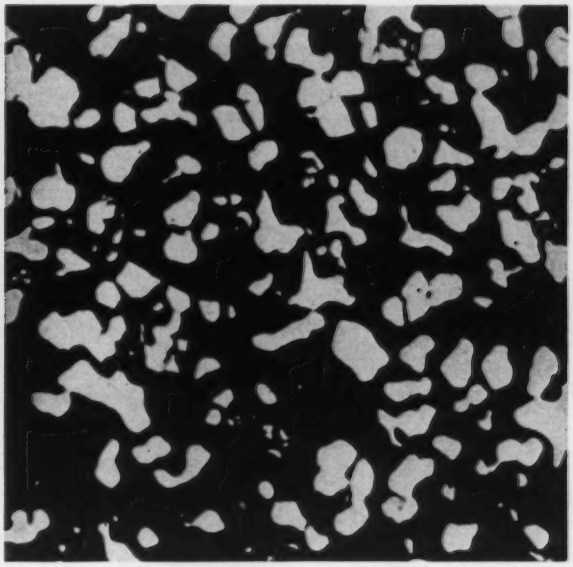
• Manufacturing methods for the powders determine their pressing characteristics.

The shape of the powder is controlled by its production process. Powders made by the reduction of an oxide are usually porous, equiaxed, and angular; vapor deposited



X 2000

Usual shape of hydrogen reduced tungsten

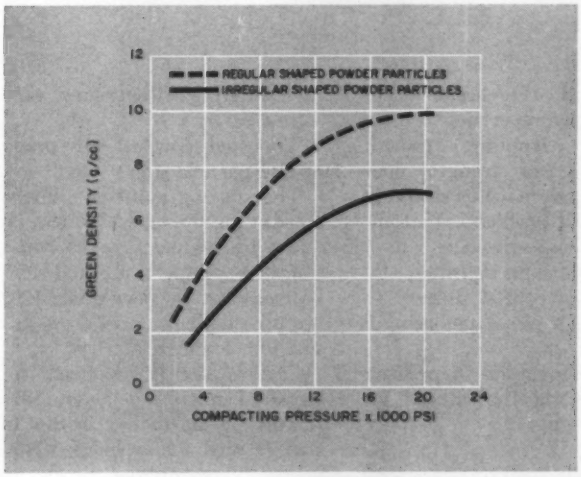


X 2000

Irregular particles alter properties (see below)

powders are normally spherical; electrolysis produces dendritic type particles.

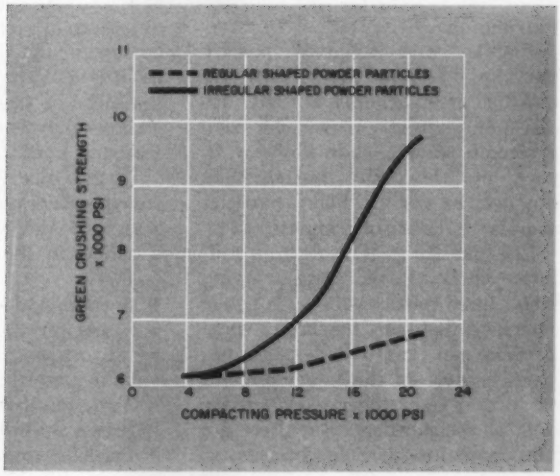
The ductility of the particles is determined by the manufacturing method and by the presence of impurities. Fine powders made by mechanical grinding of coarser particles have been work hardened and are usually annealed before compacting. Atomized and electrolytically produced powders are heated in a reducing atmosphere; this anneals them at the same time it reduces residual oxides.

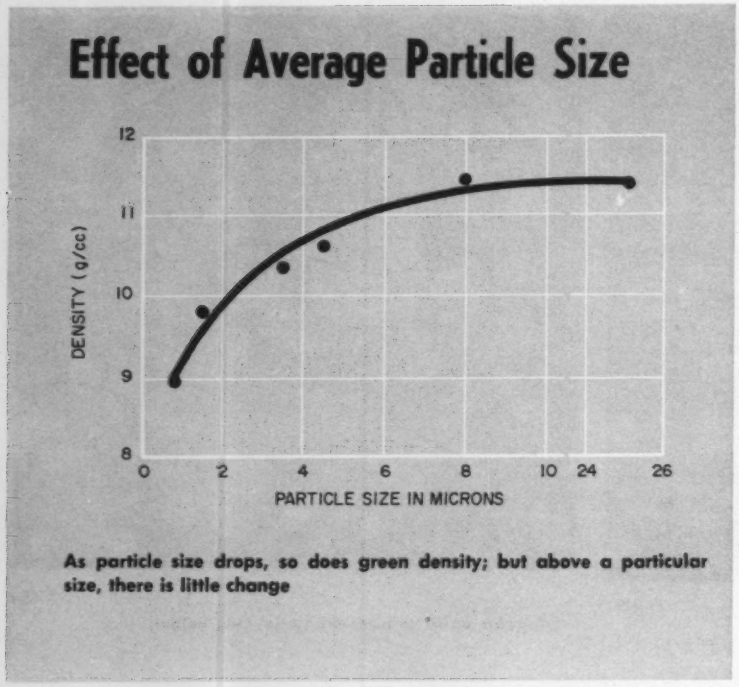


• Interparticle bonding is effected by the material and by the compacting conditions.

The purpose of the compacting step is to produce adequate strength and density. Strength determines the ability of the compact to withstand handling prior to sintering; density may determine the physical and mechanical properties of the sintered compact.

Under the compacting pressure, atoms in adjacent particles are pushed toward each other, and their force fields overlap. The bonding between particles largely depends on the extent of this effect; with ductile metals, it may be extensive; while for hard particles, contact areas are smaller, and interatomic





As particle size drops, so does green density; but above a particular size, there is little change

bonding is limited to areas where abrasion or fracture occurs.

Interparticle bonding, though important in green strength, does not always govern the sintering characteristics of powders. Uncompacted—or loose—powders have been sintered to high densities; slip cast powders have been sintered to densities as high as 98 per cent of theoretical.

Particles of irregular shape may interlock mechanically without interatomic bonding.

• Particle shape affects flow and compactability; so do size and size distribution.

Angular and equiaxed powder particles offer the best chance for making green compacts that are dense and strong. If particles have a smooth surface, they are easy to pack into the cavity, but they do not deform easily. Flaky particles are also inferior for compacting.

Low density may result from uniform particle size; with varying sizes, finer particles flow into the interstices between the larger. Fine particles can cause low density compacts because of the larger amount of friction from the greater surface area of the powder. But there are also more interparticle contacts, so that sintering will progress rapidly.

• Tungsten powders are produced in fine particle sizes.

The starting point is a finely divided tungstic oxide, which is reduced by hydrogen or carbon. So tungsten powders are too fine to be measured by sieve analysis; they are all smaller than 400 mesh, the smallest commercial sieve.

Particle size is expressed in microns (1 micron is about 39 millionths of an inch); if the tungsten is used for carbides, filaments or welding electrodes, the size range is 1 to 6 microns—in this range, a difference of 1 micron is a large percentage of the total. Differences of as little as ½ micron will influence hardness of cemented carbides, or change the workability of swaged tungsten bars.

Particle size distribution of tungsten powders characteristically narrow, and the particles tend to be spherical in shape.

• A combination of several factors accounts for the poor compactability of tungsten powders.

Four reasons are given:

• Tungsten powders are inherently brittle, so initial bonding is poor.

• Particles are rounded, rather than irregular; there is little chance for interlocking to contribute to green strength.

• Particle size is fine, causing high friction during pressing.

• The size range distribution is narrow, so there is little possibility of increased density or strength from filling interstices.

• Use of irregularly shaped tungsten particles will help in building green strength of compacts.

Although particle shape is important in the pressing of any type of metal powder, it is particularly so for tungsten, which is not ductile. In general, irregular particle shape can be expected to result in stronger compacts than smooth or flaked types. For ductile particles, such as iron or copper, they provide a greater surface area for cold welding; this in turn determines the green density and strength and the results after sintering. Mechanical interlocking, in the case of ductile powders, is of minor importance. For brittle powders, like tungsten, welding is of lesser moment and the interlocking becomes a governing factor.

The photomicrographs show examples of tungsten powders—they were produced by hydrogen reduction of tungstic oxide, and they have about the same particle size. One is irregular in shape; the irregularity includes all sizes of particles within the range, although some rounded particles are also apparent. (See Page 67.)

• Comparison of the test results shows the effect of irregular particles.

When samples of the two powders used (unlubricated) were compacted in a single pressing in a 1.0 in. diameter die, the results of irregularities became apparent. (Standard samples, 60 grams, were used.) Density was determined by comparing the weight in air to the measured volume; crushing strength was determined by slow crushing of the compacts.

Compact strength values are greater for the irregular particles over the entire range of pressures. While the difference is small at low pressures, it increases as the compacting pressure becomes greater. It seems that the difference is due to a greater amount of interlocking of

the more irregular particles. Higher pressures cause greater interlocking, both in number of particles and in degree of interlocking.

The increased green strength is obtained with the sacrifice of some green density, as compared with the more regular powder. Probably the irregular particles develop more friction during pressing, so that more pressure would be needed to develop the same density. And increased pressure means greater friction, so the difference becomes greater at high pressures.

The strength and density of both of the materials increase as compacting pressure is increased. There is a tendency for the change to be less above 16,000 psi.

In the case of irregularly shaped particles, unlike the rounded, the strength continues to increase with increasing pressures although the density does not change markedly. The increasing strength at nearly constant density is hard to explain by an interlocking mechanism. It is possible that localized heating takes place within the bulk of the compact because of greater friction. Then localized plastic deformation with an increase in strength but without a reduction of porosity becomes possible.

When comparing hydrogen reduced, rounded particles with particles made by fused salt electrolysis, but otherwise of the same particle size, somewhat similar effects were observed. (The Reno Metallurgical Research Center of the U. S. Bureau of Mines made the particles by electrolysis.) When equal weights of the two materials were compacted under equal pressures, the densities were the same, measured at 11.5 grams per cu cm. Crushing strengths were markedly different. For the fused salt powder, crushing strength was 2500 psi, while the hydrogen reduced material was only 500 psi.

• Distribution of particle sizes affects green strength and density.

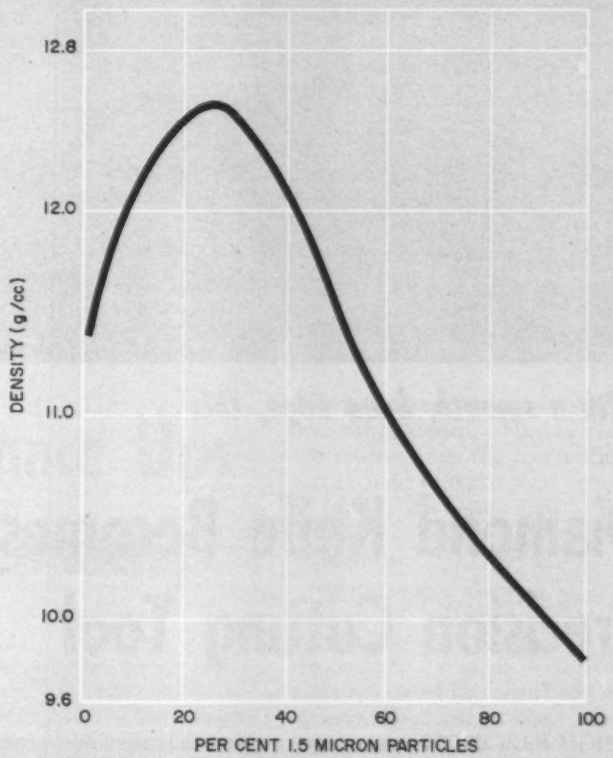
The more brittle the material, the more important is the proper control of size distribution, but it has been shown that for molybdenum (less brittle than tungsten), the highest green density for pressure compacted powders was obtained by the use of a mixture of 20 to 30 per cent of a 2 micron powder with the balance a 10 micron powder. For slip casting molybdenum, without pressure, the highest green density is obtained with the finest powders, which also produce the highest sintered density.

With tungsten, higher green densities are produced by the use of coarser powders, up to about 8 microns. Over this value, the increase is negligible. Particle size distributions are also important, and the correlation between the various methods of measuring particle size is limited in the sub-sieve ranges. In the powders used, the range of sizes increased with increasing average particle size. One way to consider the size range factor is in terms of the spread of maximum to minimum sizes.

If the packing of the particles is a factor, an addition of fine particles to a coarser powder should cause an increase in the green density of the compact. Using mixtures of 25 and 1.5 micron powders, it is seen that this is the case up to a critical ratio, after which density again decreases as the effect of the finer powder becomes predominant. Coarse particles alone have a low green density because of voids which can be filled by finer particles. As more of the finer particles are added, they eventually form the continuous component of the mixture, and the effect of surface friction of the finer particles becomes predominant.

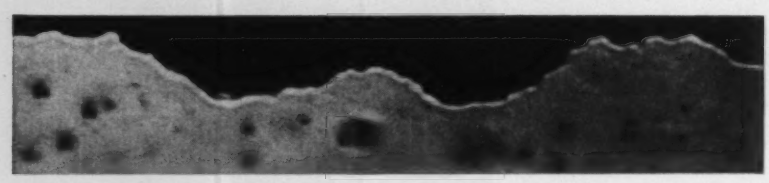
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Effect of Particle Distribution

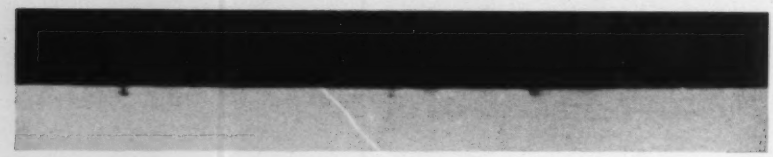


Blending relatively coarse and fine particles shows there is a mixture with optimum green strength

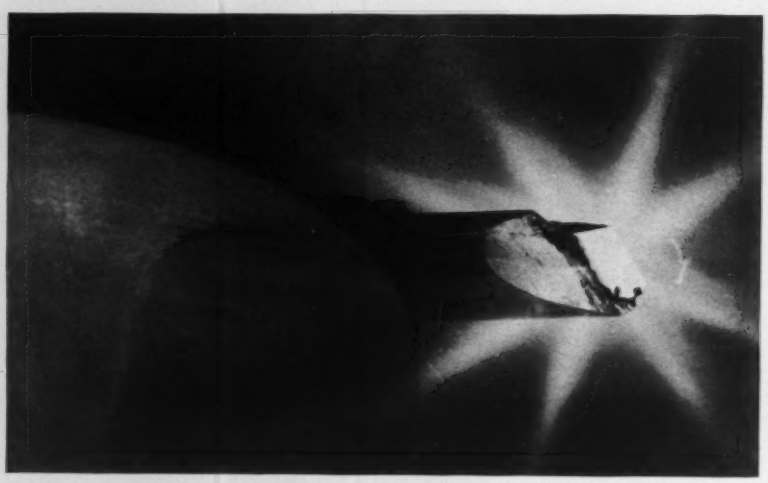
RAZOR BLADE EDGE



COMMERCIALLY SHARPENED DIAMOND



DIAMOND KNIFE



With a smooth, keen edge, this . . .

Diamond Knife Becomes Precision Cutting Tool

• HIGH PRECISION cuts on metals and nonmetals can be made with a diamond knife; it's so finely ground that the radius is equivalent to 12 carbon atoms.

Produced in the Mechanical Research Laboratory of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., the knife is being used for a number of research projects, says Du Pont's Earl Sugg.

Du Pont's varied interests include closer tolerance machining for both production and laboratory equipment used to make precision products.

• Stones for the knives are selected from flawfree, gem quality diamonds that are properly oriented for the subsequent steps.

Cleavage (rough forming by splitting) and grinding follow unconventional procedures; final polishing must be ultraprecise.

The diamond knife is supported in a metal holder which may be stainless steel, tool steel, or carbide. Soft solder or silver solder holds the stone in place. An evaporated metallic coating on the diamond permits metal to metal joining.

• Largest knife made by Du Pont so far is 9/32 in.

One other company in the U. S. and two overseas make similar devices, but 1/16 in. heretofore has been considered big. The knife was first developed in Caracas, Venezuela, by Dr. H. Fernandez-Moran, who wanted to make better biological specimens.

Length limitations in producing the knives are not yet known. They may be controlled only by the size of diamonds available.

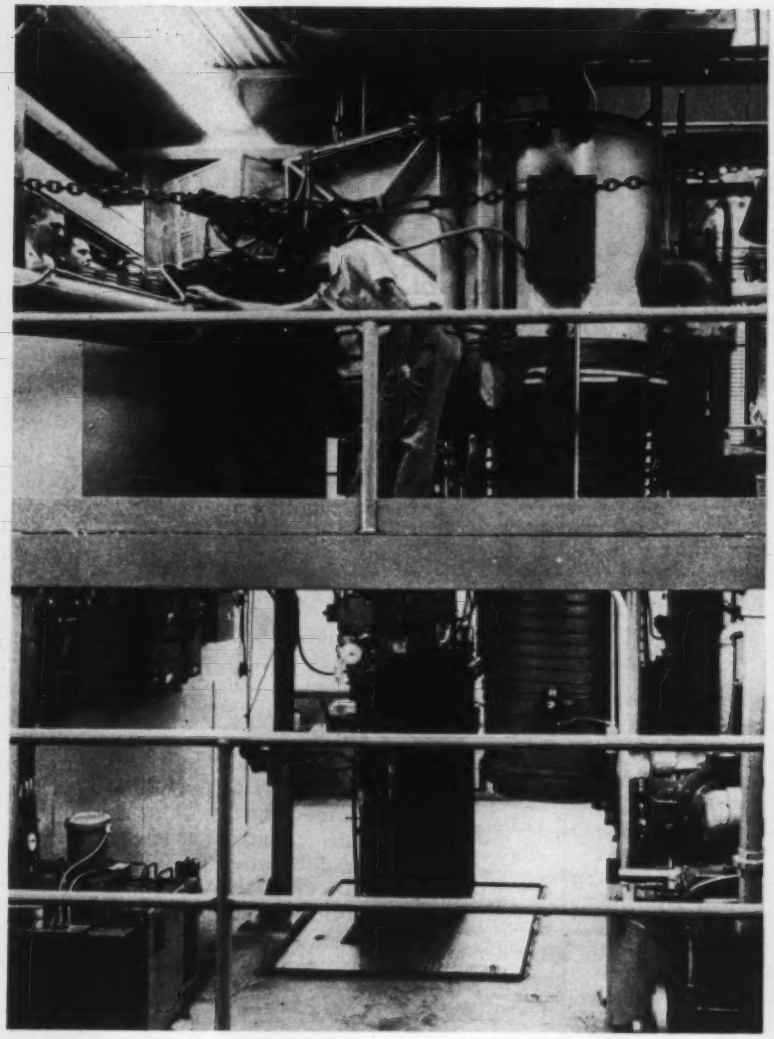
• To obtain the precision the knife permits, special cutting tools are required.

For one thing, the knife must be properly held to avoid vibration. Knives fail from abuse rather than from wear, says Mr. Sugg.

The knife is set up under a microscope. Cuts should be less than 50 millionths of an inch. If the machine is rugged enough, and precise enough, no lapping is necessary. Metal cutting operations so far tried have been planing; turning will be next.

With a cutting edge 0.1 millionth of an inch, and an adequate cutting machine (like a microtome, used in preparing tissue samples) an undistorted, highly polished surface remains. Tests have shown that the surface can be used for metallographic examination, without polishing. Pure metals as soft as lead or tin, bismuth, indium, silver, copper, aluminum, cadmium, zinc, brass, mild steel, and stainless steel have been cut for metallographic samples. Hardness of the stainless steels has ranged from Rockwell C 45 to C 62.

Knives can be resharpened a number of times at one-fourth to one-third the cost of a new one.



Ingots of pure columbium and tantalum, up to 8 in. OD and 42 in. long, are melted in this 300 kw, electron beam furnace, one of the country's largest

Electron Beam Furnace Ups Refractory Metal Capacity

• HAYNES STELLITE CO., Kokomo, Ind., a division of Union Carbide Corp., is counting on a new, 300 kw, electron beam furnace and a recently developed columbium alloy (CB-752) to make it a major contender in the refractory metal market.

Haynes is no stranger to the refractory metal field. For several years, it has been supplying tantalum products and hot pressed tungsten shapes. Now, says the company, wrought forms of columbium and vanadium are available as production items in rods, bars, wire, sheets, strip, and plates.

• Haynes executives are hopeful the new alloy will pin down the markets for columbium that have so far been elusive.

Claims Haynes: "The alloy can be fabricated by conventional methods including welding, and has an ultimate strength over 25,000 psi at 2400° F. The ability to fabricate the alloy and to form a ductile weld joint with it eliminates one of the major stumbling blocks in the application of high strength columbium-base alloys." Haynes also claims the alloy is not embrittled on heating as much as other columbium alloys.

CB-752 contains 89 per cent columbium, 10 per cent tungsten, and 1 per cent zirconium.

• With installation of the new furnace, Haynes joins the handful of U. S. firms using the technique to produce refractory metals.

Proponents feel the electron beam furnace produces the highest purity and most easily fabricated material because an electron is noncontaminating and because the melting takes place in a high vacuum.

Other specialized equipment at Haynes includes a consumable electrode, vacuum arc furnace; vacuum annealing facilities; and a welding dry box. Such conventional equipment as a 2000 ton forge press, standard sheet, plate, and bar mills, a Sendzimir cold finishing mill, and wire drawing equipment are also used to produce the wrought refractory shapes.

With conventional equipment, the company says it can cold roll columbium and tantalum down to 12 mils thick, up to 48 in. wide, and up to 120 in. long.

• Hot pressed tungsten is being actively promoted. Haynes claims the process gives fine grain size. It can be used to make parts equal to a 14 in. diameter circle. Parts weighing as much as 250 lb have been made.

Market applications are still being sought. Tungsten has numerous space and civilian high temperature potentials. Tantalum looks promising for missile and high temperature furnace uses, but its major market will probably continue to be in electronics. Vanadium may find a market in nuclear energy components, superconductors, and turbine blades, and in less glamorous uses such as chemical processing gear, electronic components, and fasteners.

Harder Sell Needed for Export Business

U. S. machine tool builders can capture a major share of a five year, $100 million market in Finland, says Minneapolis builder on return from that country

• TO SELL capital equipment abroad, U. S. builders will have to treat overseas buyers more like customers, less like foreigners.

So contends William H. Drisko, president, Stone Co., Minneapolis. He has just returned from six weeks as a member of the Department of Commerce's U. S. Trade Mission to Finland. As proof of his contention, Mr. Stone says he sold more than $500,000 worth of machine tools while he was in Finland, including two numerically controlled machines.

"Too often, U. S. builders don't even act anxious to take orders from foreign buyers, let alone go out to sell them," asserts Mr. Drisko. A case in point: A Finnish manufacturer told him he queried three U. S. builders about a $50,000, standard machine tool. In response to his inquiry, one builder sent a catalog and a price quotation. The other two didn't even answer. The builder who sent the price didn't follow up, and an Italian machine was finally bought. Today, the Finnish company feels it should have worked harder to get help from the U. S. builders—the Italian machine is not entirely satisfactory.

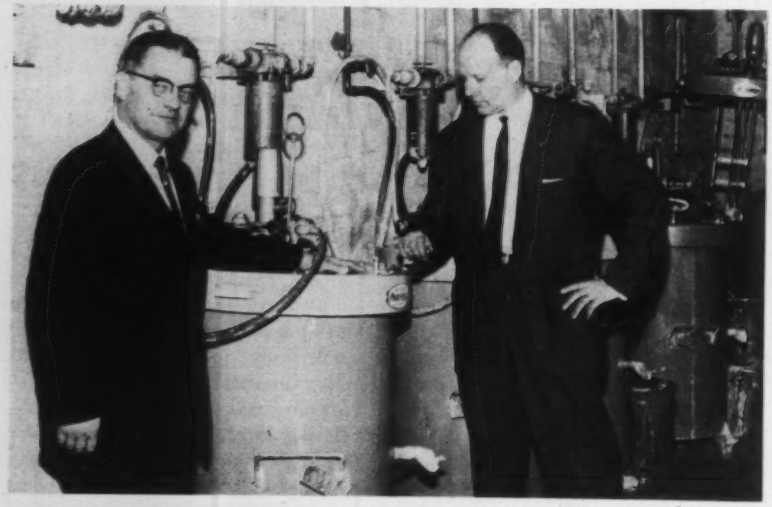
• Foreign sales can be boosted simply by going after them. Here are some tips.

U. S. builders have a temporary, but important, advantage over their foreign competitors. Delivery time is shaved a year or more in some cases by U. S. builders. But Mr. Drisko says that when that difference is wiped out, U. S. builders still don't need to surrender to the oft-cited price problem. "Foreign buyers are perfectly willing to pay the difference in cost for the U. S. built machine. But they'll do so only when they know, or when you show them, that the price is justified."

Mr. Drisko criticizes U. S. builders who quote machines on the basis of capacity and other standard measures. Any lathe builder in the world can offer a machine that will take 2 in. diameter stock, he points out. And if that's all you sell, then the cheaper foreign machine sounds equal. "Sell productivity, metal removal rates, tolerance capabilities, and all the other advantages of rugged, high performance U. S. machines. Then, in many cases, the so-called foreign equivalents can't compete."

Another suggestion: Spend some time teaching your foreign salesmen or distributors how to sell. Make sure they know all they need to about the capabilities of your equipment, and make sure they are selling its capabilities, and not its dimensions, price, or capacity.

Further, Mr. Drisko says U. S. builders must be more willing to grant credit to foreign customers, and they must be willing to eliminate some red tape in getting the credit established.



William H. Drisko (left), president, Stone Co., Minneapolis, shown here with Reino F. Ravantti, general manager, Upo Osakeyhtio, Lahti, Finland

• Finland will be a $100 million market for machine tools in the next five years. It's a good place to start your foreign selling.

Mr. Drisko feels U. S. machine tool builders, particularly those with standard machine tool lines, can get most of that $100 million market.

He says that Finland will double its metalworking capacity in the next five years. They'll build more capacity for making pulp and paper processing machinery. And they'll expand their basic metal producing capacity (STEEL, July 31, p. 34). In addition, much of Finland's metalworking industry is out to diversify.

First from General Electric (1959)... another bright idea that became a better lamp for you

G-E All-Weather Fluorescents shine brighter when mercury drops

Mister Magoo says . . . "1959? A chilly year! Alaska joined the Union, and General Electric invented the All-Weather fluorescent. Happy birthday, All-Weather. Humph! Packaging experts! Who needs a wrapper on a pool cue?"

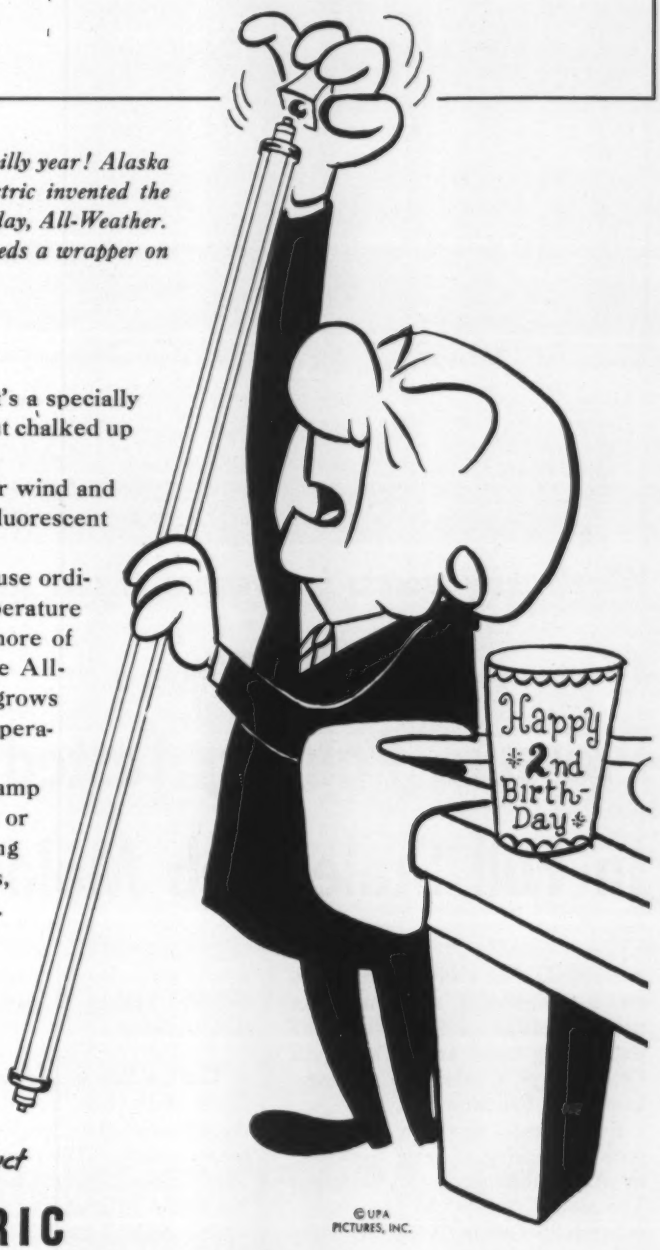
DON'T drop your cue, Mister Magoo. It's a specially jacketed All-Weather lamp, another first chalked up by General Electric.

It wears that glass jacket to ward off winter wind and cold. Below freezing, it's the most powerful fluorescent lamp you can buy.

General Electric developed this lamp because ordinary fluorescents grow dim when the temperature dives toward zero. Often they lose 90% or more of their warm-weather light output. But the All-Weather fluorescent T10J—a G-E exclusive—grows brighter the colder it gets! Use it where temperatures sometimes drop below 40°F.

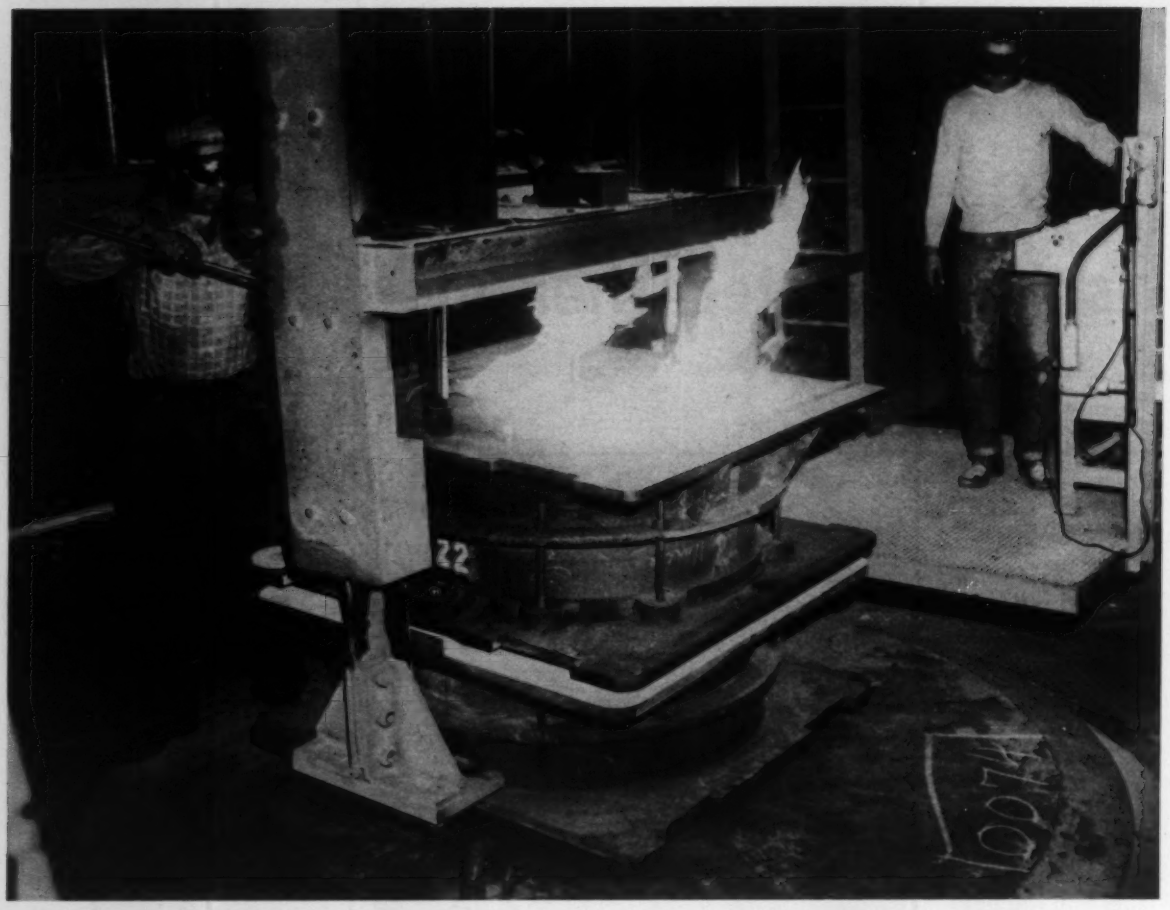
You can use the T10J—or its companion lamp (T10) without the "storm window"—indoors or out. Examples: walk-in freezers, shopping centers, drive-ins, parking lots, street lamps, store fronts, airports, docks, signs, gas stations.

Both come in 4′, 6′, and 8′ lengths. Ask your G-E distributor to show you these two exclusive examples of General Electric lighting leadership. General Electric Co., Large Lamp Dept. C-111, Nela Park, Cleveland 12, Ohio.



Progress Is Our Most Important Product

GENERAL ELECTRIC



Wheelmaking process is revamped to cast semifinished shapes . . .

Pressure Pouring Tested In Full Scale Slab Molds

• DIRECT CASTING of steel slabs on a commercial scale may be proved feasible with a machine that's being tested at Griffin Wheel Co., Chicago, a subsidiary of American Steel Foundries.

Experimental work on controlled pressure pouring is being continued by ASF subsidiaries and licensees. The aim: To adapt the process, developed by Griffin Wheel to make railroad car wheels, to the production of steel shapes suitable for subsequent rolling, forging, piercing, or machining.

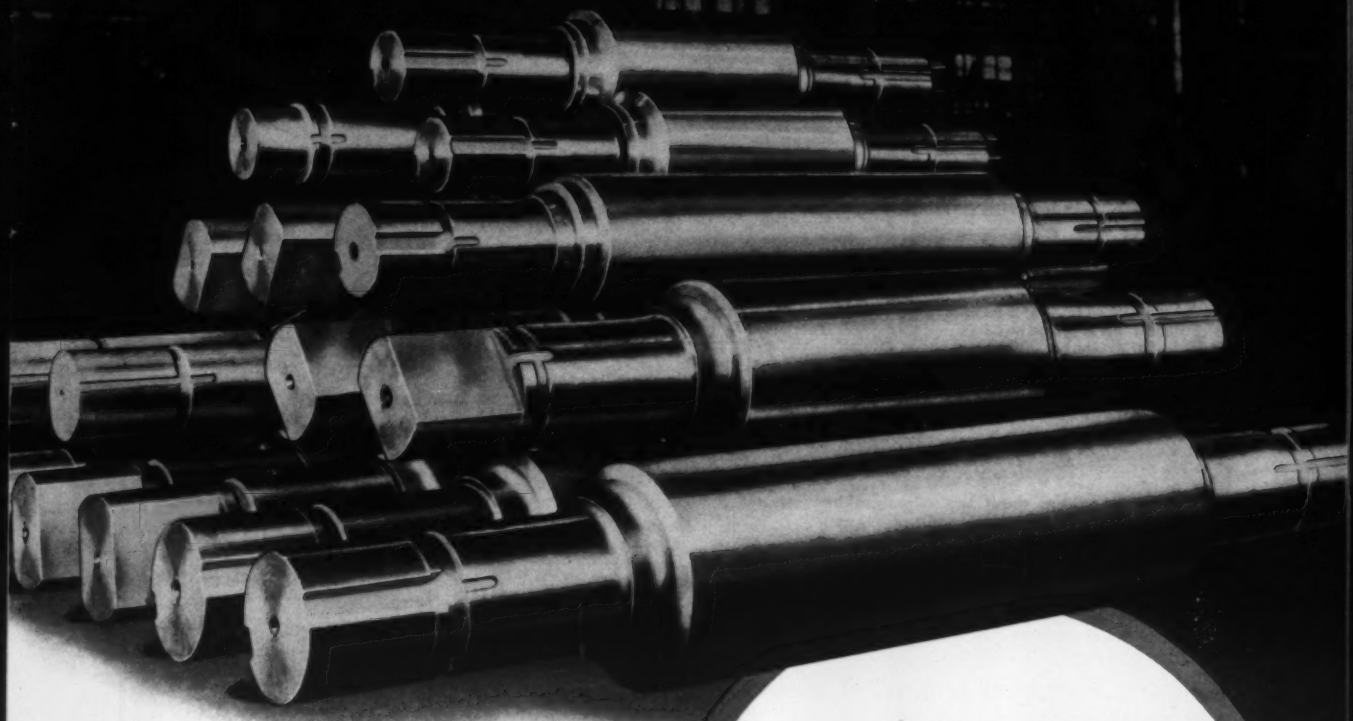
• The machine is expected to make larger slabs, bars, and billets than those produced by previous experimental units. The machine was built at the Lorain, Ohio, plant of American Shipbuilding Co.

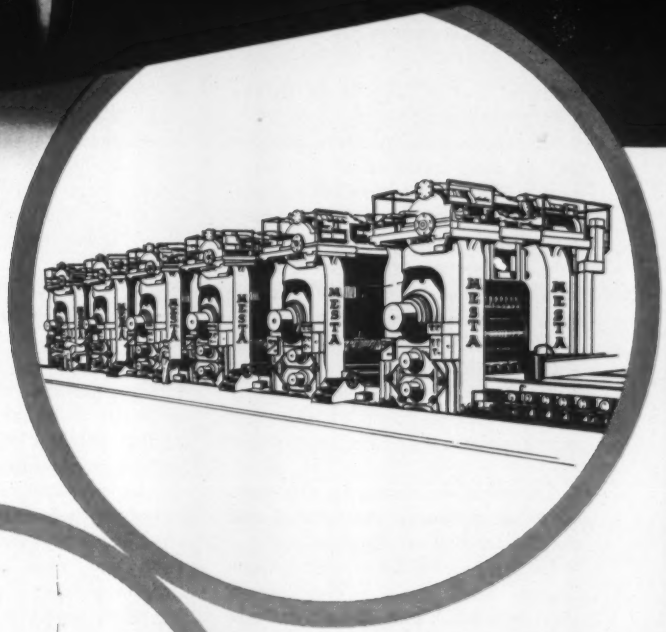
The mold handling mechanism, which passes over the pressure pouring pit on rollers, is expected to make possible the casting of slabs about 25 ft long and up to 65 in. wide. The mold lining is made up of many graphite blocks, in contrast to the one piece, machined graphite linings used in earlier pressure pouring molds.

Experimental work at Griffin Wheel's research laboratory, Bensenville, Ill., during the last three years, has yielded carbon and stainless steel slabs 14 ft long, 3½ ft wide, and 5 in. thick. Pouring time per 5 ton slab: 1 to 2 minutes. Experimental slabs have been rolled into strip and used in a wide range of consumer products.

• Much of ASF's research on pressure pouring is aimed at finding

MESTA ROLLS





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Equip your Hot Strip Mills with:

- "Mesta Special" Alloy Steel Rolls
- Mesta Chrome-Moly Alloy Steel Rolls
- Mesta Nickel Grain Grade "R" Rolls
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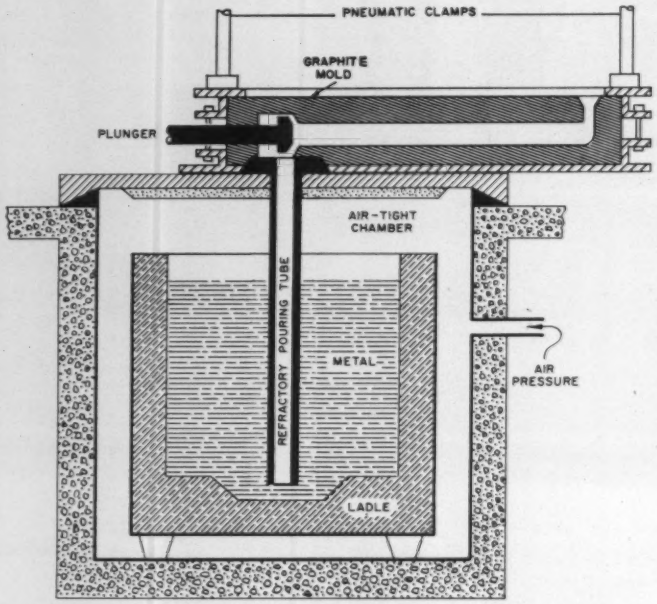


STEEL's editors think the wheelmaking mechanism, adapted to slab-making, would look like this. ASF's new machine may be similar

products that can be made in the company's plants.

An experimental pressure pouring pit has been installed at the company's Indiana Harbor (Ind.) plant. Early trials indicate that direct casting could be a starting point for several types of products—it could produce billets for making welding rods, or special shapes for forging.

Promising results have also been obtained in the direct casting of bimetal shapes, which would have a durable, stainless steel exterior and a less expensive, carbon steel base.

• Licensees are adapting the process to the production of castings and semifinished steel shapes.

License agreements with Washington Steel Corp., Washington, Pa., and Michigan Seamless Tube Co., South Lyon, Mich., were announced recently by Joseph B. Lanterman, ASF president. The pressure pour process will be used by the licensees to make blooms, slabs, billets, and tube rounds.

Encouraging results are reported from Chicago South Works of United States Steel Corp., where the process is being applied to volume steel mill operations. The corporation signed a license agreement in 1959 for direct casting of slabs, blooms, tube rounds, and billets.

Castings that weigh up to 1600 lb are being direct cast at Lebanon Steel Foundry, Lebanon, Pa. The company holds a license (1958) for pressure pouring of foundry products.

• The process eliminates several steps in steelmaking. It provides higher product yield and reduces surface conditioning requirements.

The pressure pour method employs air pressure to force molten steel upward through a ceramic tube and into a semipermanent, graphite mold. The controlled rate at which steel is forced into the mold is said to make for closer tolerances in castings and to provide a surface that requires minimum conditioning.

Five ASF plants are making railroad car wheels by the direct casting process. A sixth, under construction at Bensenville, is slated to go into operation about September.

Specialty Iron Process Makes Use of Charcoal

CHARCOAL IRON, produced to close specifications at Wundowie, Western Australia, is shipped to selective markets in Australia and to buyers in the U. S., Canada, Japan, and several European countries.

Production of the charcoal iron was started in 1948, in a 30 ton a day pilot plant. Present output is 55,000 tons a year, of which 50,000 tons are exported.

• Forests Furnish Fuel — The Wundowie facility uses wood as a major raw material. Australia has abundant iron ore deposits, but it doesn't have high grade coal for metallurgical coke.

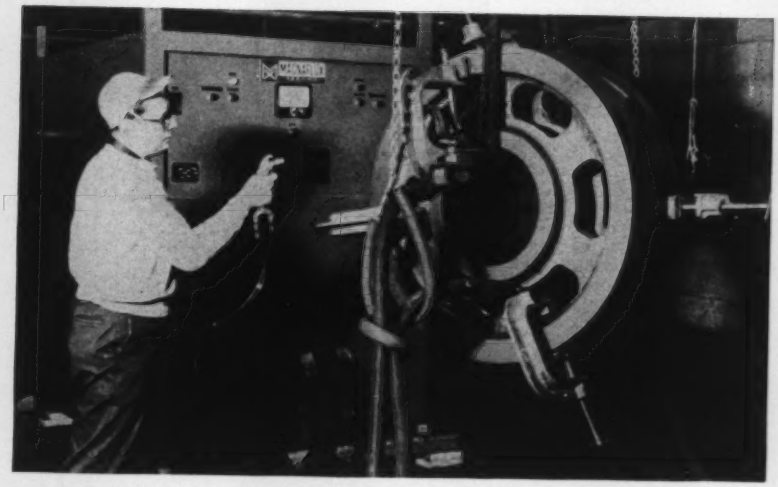
Saw milling and wood distillation are also carried on at the installation. Millable trees are processed for maximum timber recovery, and only waste wood is carbonized.

• High Grade Iron—The charcoal is relatively free of ash; it is useful in making the kind of iron that's needed for special castings. The iron is said to be particularly suitable for ductile types of iron castings, spheroidal cast iron, GS Meehanite, and iron for rollmaking.

Many founders use the iron to correct analyses of lower grade melts, which could not otherwise be used in castings for critical applications. Main iron source: Hematite (62½ per cent iron) from the Koolyanobbing ranges, 200 miles away. The ore is said to be extremely low in sulfur, phosphorus, and other undesirable elements. The hematite is used exclusively in iron for export, but it is mixed with local ore (40 to 45 per cent iron) for Australian use.

• Standard Grades Use Coal—Pig iron for steelmaking and general foundry applications is also produced at the plant. Manufacture of those irons varies from the charcoal process, and employs low ash coal from open pit mines at Collie, several hundred miles south of Perth.

The coal is carbonized in retorts, or placed directly in the blast furnaces as supplementary fuel.



Part is sprayed with fluorescent suspension, then . . .

Inspected under ultraviolet light . . .

Magnetic Method Reduces Inspection Time Over 90%

• MAGNETIC PARTICLE inspection time has been reduced more than 90 per cent by a three way magnetization process at Birdsboro Corp., Birdsboro, Pa. On the basis of present production rates, the machine should pay for itself in nine months, the company estimates.

Birdsboro used magnetic particle inspection procedures previously; the new equipment is based on similar principles.

• The new magnetization procedure eliminates several steps.

To show up potential cracks or flaws, the company had used portable Magnaflux units. Power was applied in one direction only, and several tests were required by internal fillets or cored openings.

Narrow openings had to be reached with test prods, and the average number of particle inspections had been nine; it is now three or four. That saving, the reduction in time per each inspection, has meant a 90 per cent cut in the manhours required to inspect each casting. Further, a backlog of castings had accumulated for inspection; it has been eliminated.

The new machine, built by Magnaflux Corp., Chicago, subsidiary of General Mills Inc., employs what is called the "vector" method. It permits a single magnetization cycle, and a single inspection, to replace several.

• Separate magnetizing currents are directed through three circuits.

The magnetizing unit is rated 8000 amperes, 3 phase, full wave, direct current, and is considered adequate for sectional and over-all magnetization of ferromagnetic castings weighing up to 25 tons.

In the magnetization process, separate currents are directed through each of three circuits. While only one magnetic field may exist in a part at one time, the cyclic system results in magnetization in three planes.

• Dry methods have been replaced by wet methods for the developing powder.

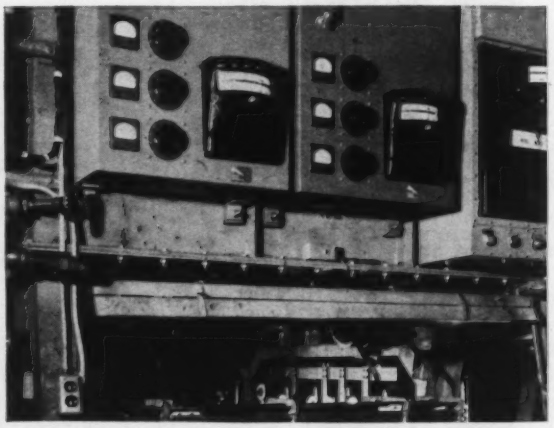
While the test casting is being magnetized (a remote switch permits operator control of the power unit) the operator sprays the casting with a water suspension of the fluorescent inspection material. Ultraviolet light is used to see the location of the fluorescent particles that show flaw sites.

• Sensitivity of the vector process aids inspection.

Although the time for inspection has been cut (in the case of the gear pictured, one man does the job in 20 minutes vs. 7 manhours before), the vector method is showing up defects that were difficult to detect by the previous method.

Barber-Colman Automatic

Complete saturable reactor temperature control by Model 407 Capacitrols of wire enameling ovens saves time, bother and heat energy. The appearance of the coatings is improved and abrasion tests show consistently higher coating resistance.



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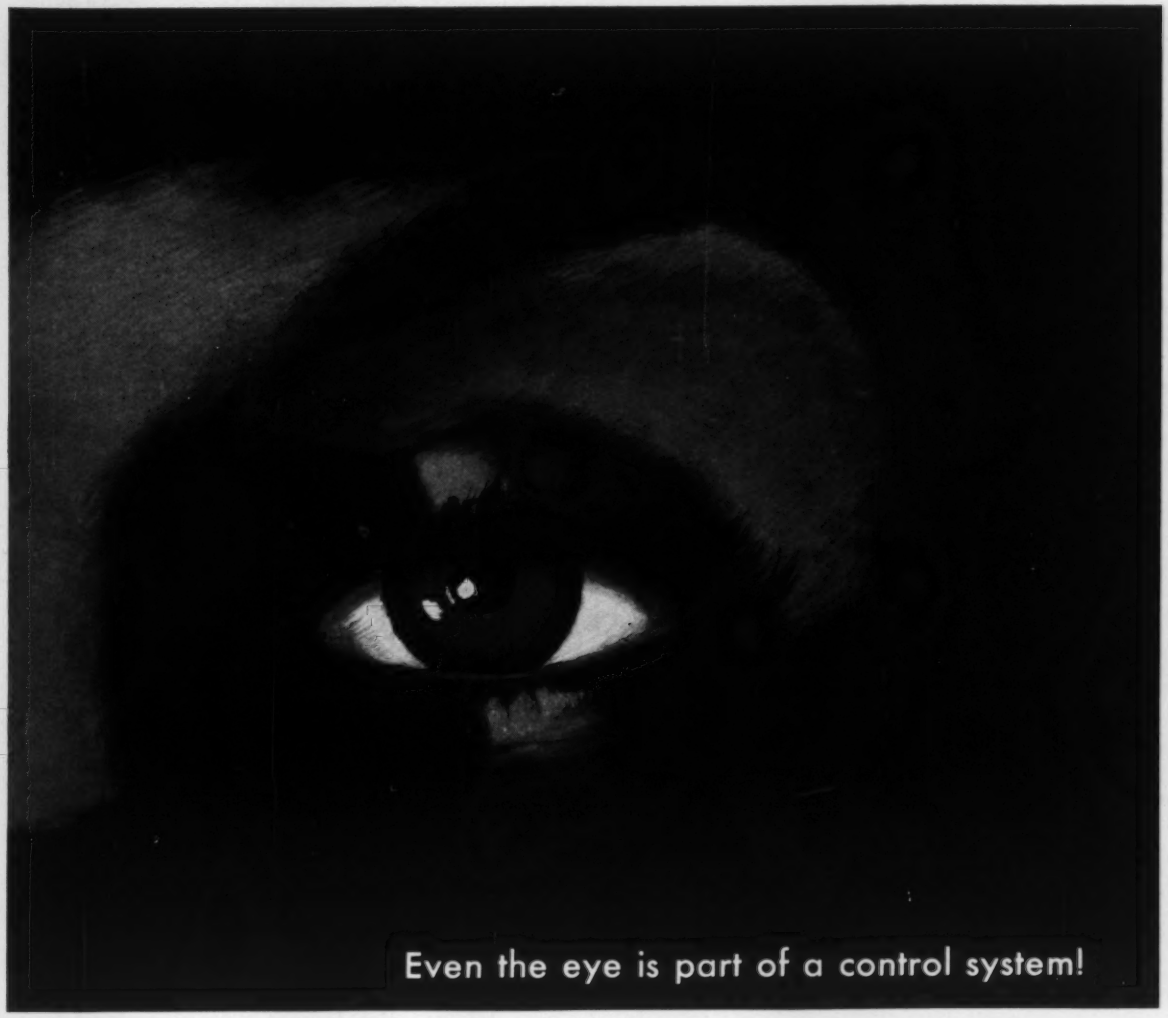
Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components •



Process Control Systems

Wheelco sensing devices serve their control center just as the eye does. Light, heat, pressure, flow and other process variables are detected, measured, converted to self-regulating systems, and held within close limits by fine Wheelco instruments. Backed by twenty-five years of process control application, Barber-Colman can design a more profitable control system for your process. In the planning stage, call in a Barber-Colman, Wheelco Field Engineer to learn about the newest in instrumentation. His number is in the Yellow Pages.

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Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

Paperboard Containers

End Handling Problems

• TWO MAJOR benefits resulted from the adoption of a packaging and material handling program at Dalton Foundries Inc., Warsaw, Ind. Dalton's company and product identification were dramatically improved, and customers realized an estimated 60 per cent saving in handling time.

"Modern packaging methods and modern sales promotion ideas have vital roles in the foundry industry. This is especially true of packaging. It is here that we are able to give better service and also lower material handling cost for our customers," says Joseph Shellabarger, vice president, industrial sales.

• **The first part of Dalton's two way program covers the flow of castings into customer plants. At one customer's plant, unloading time was reduced from 5 or 6 manhours to 15 minutes.**

In Dalton's finishing, grinding, and cleaning department, 36 x 36 x 24 in. corrugated pallet containers are placed behind every work station. When they are filled, fork lift trucks carry them into storage on metal racks. In filling orders, fork trucks load the pallet containers directly onto contract or commercial carriers for shipment to customers. Container capacity ranges from 1000 to 3000 lb.

• **The other half of the packaging program covers product merchandising.**

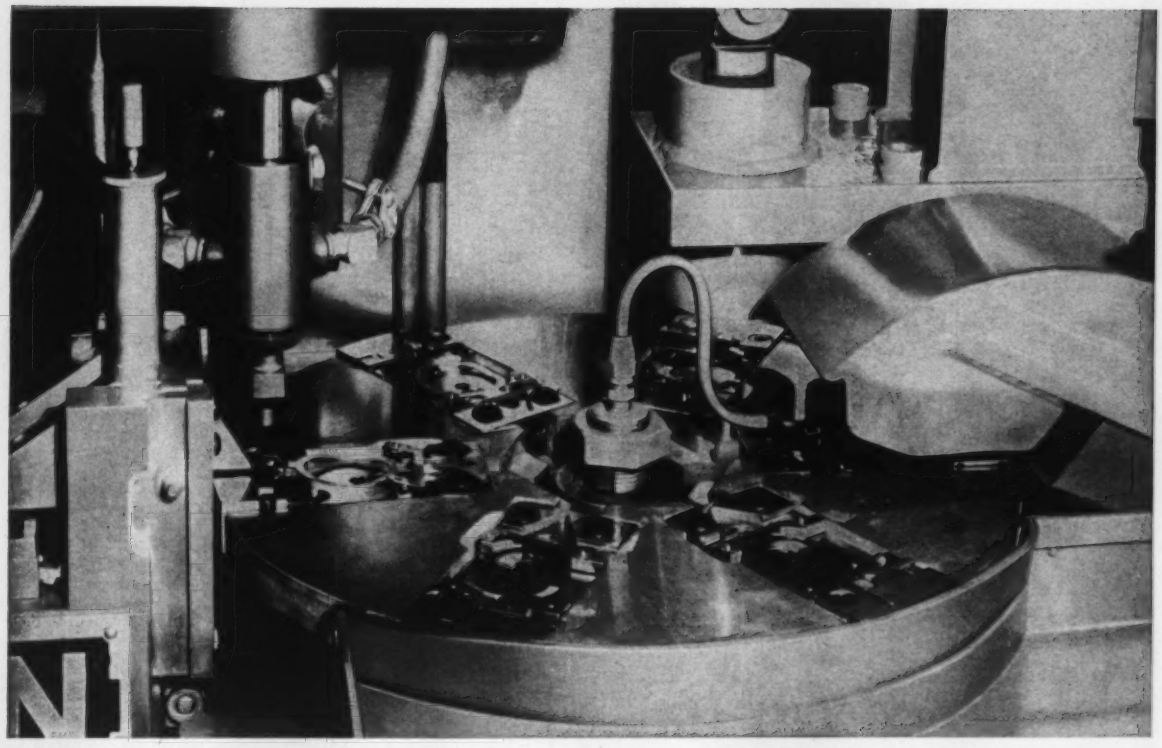
"We want our customers to be able to quickly identify our company and our products. In a customer's plant, such identification also results in substantial savings in material handling costs," says Mr. Shellabarger.

Dalton worked with the Graphic Arts Dept. of Mead Containers Div., Mead Corp., Toledo, Ohio. The design features the company's name, trademark, and products. Red and green are used on the container's whitish liner.

Previously, castings were tossed into metal barrels or heavy wooden boxes, then carried to a large storage area where they were dumped into loose piles on the floor. When they were sold, they were put into burlap bags or wooden or steel containers and transported to carriers by hand trucks or fork lift trucks. In some cases, they were handled individually and piled on truck floors.

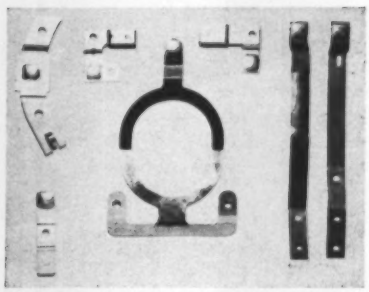
Customers had to go through the same multihandling procedure. Many manhours were piled up by Dalton, carriers, and customers.

The containers used in the program are double walled with Mead's Duo-Arch, serving as a special corrugated medium. They're stored flat in shipment and in storage.



Switch parts are welded, then coined. With interchangeable tooling . . .

Single Purpose Welder Does Seven Jobs



These parts are handled by the same tape welder. The machine has seven index table tops, one for each of the jobs scheduled

• MASS PRODUCTION specialists continue to look for special equipment that will turn out their products at high rates. Yet, more and more, they're also looking for versatility in that equipment.

Take, for example, the welding of electrical contacts at Westinghouse Electric Corp.'s Small Motor Div., Lima, Ohio. The job (motor switch assemblies) is being done at three times the old rate by a relatively conventional index table welder and interchangeable fixtures.

The machine is a magnetic force bench welder.

It has been highly automated with handling, blanking, and forming devices.

• Up to 2600 welds an hour are completed on seven different switch parts on the same machine.

The machine forms electrical contact buttons from a roll of Monel-backed silver tape. A reel feeds the silver tape through measuring, cut-off, and forming stations. Then the mechanism presents the properly oriented contact buttons to the welding stations where they meet other switch parts on the index table.

After welding, the assemblies index to a forming station which coins the contact buttons to final spherical shape. At the next station, an air jet ejects the assemblies down a chute into a storage container.

• Tooling can be changed to accommodate different parts.

Original tooling included seven interchangeable table tops for the seven parts. New tables can be added to permit switch design changes or to take entirely different classes of parts.

Tolerances are critical. The buttons have to be located exactly and be formed to proper contour. Welds must be strong and consistent. Steel, brass, beryllium-copper, and silver are welded.

Quality steel products bearing the YAWATA insignia are exported throughout the world.
When buying steel from Japan, specify YAWATA for strength, economy and versatility.

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Cable Address: YAWATAISCO NEWYORK

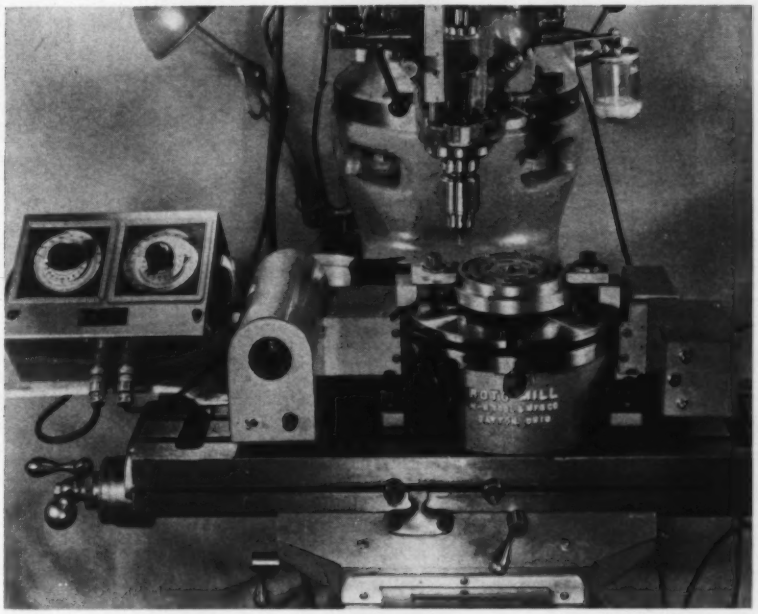
Programing of Index Table Eliminates Errors

AUTOMATIC spacing of hole patterns in degrees, ½ degree, or 1/10 degree increments is possible with the M-M 800 Roto Mill electronic index table.

It can also be used for programing a part that requires milling of slots. With a 15 in. program plate, the M-M 800 can program uneven indexes.

The company says the ability to program to the application eliminates many opportunities for errors that exist with hand operated index tables. The unit may be used in a vertical or horizontal position. It's designed for drilling, boring, jig boring, checking, milling, spacing, and many other similar applications.

For further information, *write* M & M Tool & Mfg. Co., 1124 E. Third St., Dayton, Ohio.



Savings Stressed in Decoiling, Shearing Line

THIS AUTOMATIC decoiling and cut to length line for users of mild, cold rolled, steel sheets lowers costs, says the maker, in half a dozen important categories: 1. Material. 2. Scrap. 3. Labor. 4. Inventory. 5. Storage. 6. Production.

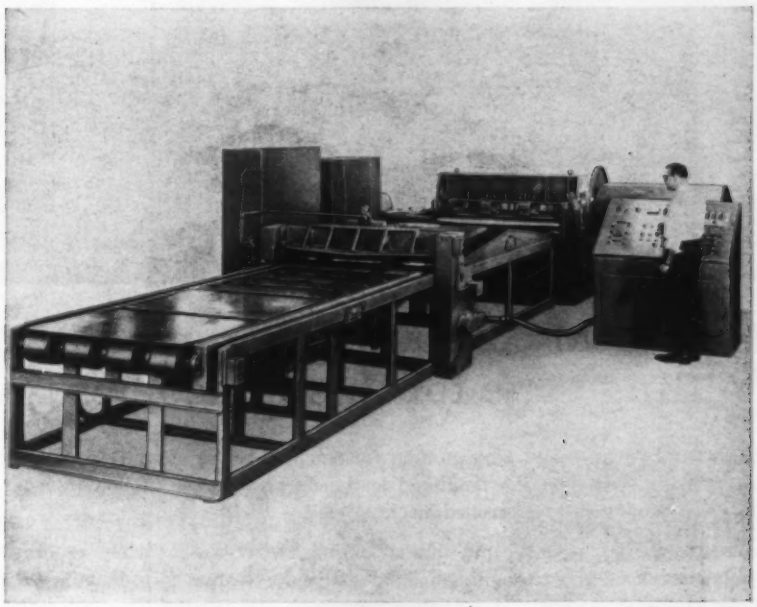
The basic line consists of a coil reel, a straightener or leveler-measuring unit, a hump table, a shear, and a conveyor unit.

The triple-backed leveler does combination straightening or leveling and measuring. It's equipped with powered pinch rolls and measuring rolls. A rotary transducer indicates linear feet.

Various capacities are available up to a maximum sheet thickness of 3/16 in. and a maximum width of 72 in. A cut length accuracy of ±0.008 in. can be provided.

Optional equipment (such as a

(*Please turn to Page* 86)

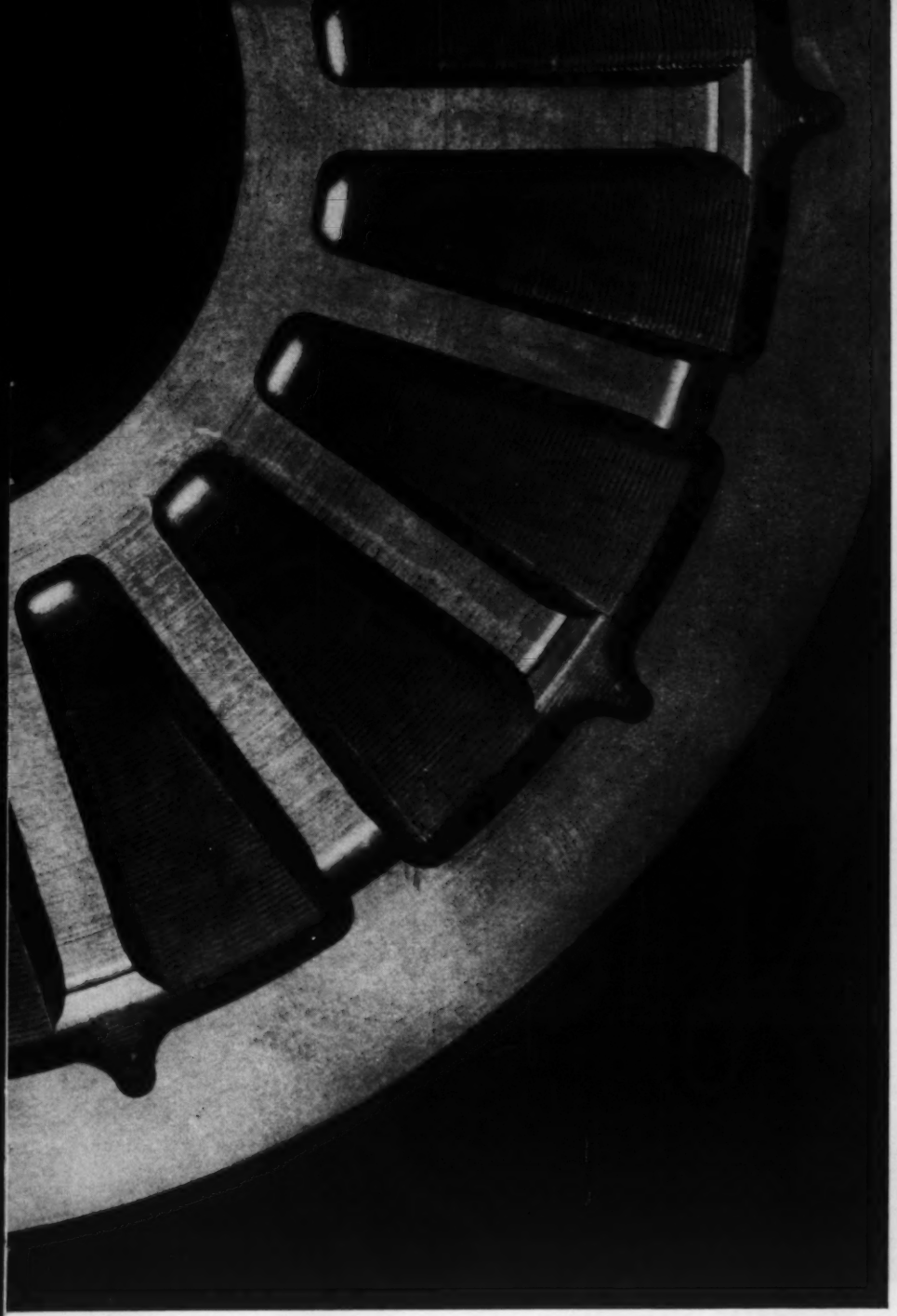


New IBM computer language...AUTOPROMT cuts milling time for this helicopter gearbox cover by 75%

AUTOPROMT (AUTOmatic PROgramming for Machine Tools) is a powerful new computer language designed to broaden the use of numerically-controlled machine tools.

AUTOPROMT, for the first time, lets an engineer *describe the surfaces* of the three-dimensional shape he wants milled, *rather than calculating every path* the tool must follow in order to machine the part.

AUTOPROMT leaves to the computer the task of automatically generating these tool paths. You describe the part to be milled and the tool to be used in simple, *English-like*



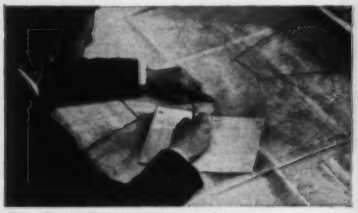
terms. The computer does the laborious calculating work.

AUTOPROMT produces results like these: the time to mill the gearbox shown in the photographs cut to *one-fourth* the machine time required by conventional methods. AUTOPROMT reduced the lead time from blueprint to production *from three months to two weeks.*

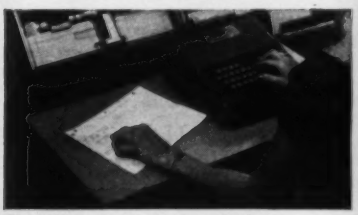
AUTOPROMT is available to IBM customers. Call your local IBM Representative for complete details on this latest advance in Numerical Control of machine tools.

IBM®
DATA PROCESSING

Here's the way AUTOPROMT works at United Aircraft Corporation

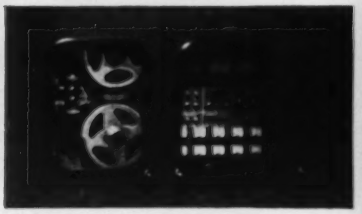


The Parts Programmer, using a conventional blueprint, prepares 180 one-line statements in AUTOPROMT language.



The statements are punched into standard IBM cards and entered into the IBM 7090 Data Processing System. (AUTOPROMT also works with the 704 and 709 Systems).

The 7090, programmed with AUTOPROMT, produces 8000 tool path instructions needed to direct the Pratt and Whitney Co. Inc. Numeric-Keller Continuous Path Milling Machine.



Punched tapes direct the Numeric-Keller Milling Machine.

The Numeric-Keller mills the helicopter gearbox cover.

NEW PRODUCTS and equipment

(*Concluded from Page* 83)

coil ramp, coil lift, peeler for heavy gage materials, tracking device, edge trimmer, scrap chopper, and stacking unit) is available.

The line has a centralized control system which includes a control console, auxiliary electrical control cabinets, variable speed drive unit, interconnecting wiring, terminal boxes, conduit, and related equipment. All wires are numbered and mounted to terminal strips (to facilitate disassembly and reassembly).

For further information, *write* Dept. 353, Lennox Tool & Machine Builders, a division of Lennox Industries Inc., Lima, Ohio.

Alphanumeric Capability Featured on Data System

INTEGRATION of the Burroughs Series E, desk size computer with a 10 total typewriter accounting machine provides a business data processing system with alphanumeric capability.

The company says the alphabetical feature eliminates the need for additional units to write descriptive information on accounting forms. Programer training amounts to a few hours with the simplified external pinboard command process. Data can be fed into the system by adding two punched paper tape readers and a punched card unit or three tape units. A third option is two punch card units. Output can be either by a tape or card punching device, or both.

For further information, *write* Equipment & Systems Div., Burroughs Corp., 6071 Second Blvd., Detroit 32, Mich.

RA 330® brings the space age **CLOSER**

RA 330 supports rocket cases in pit furnace 10 ft. diameter by 30 ft. deep.

RA 330 provides strength at 1900° F. to support, without fear of dropping, a 3500 pound load; resistance to thermal shock of rapid heating and air quenching; resistance to furnace atmosphere and oxidation.

Photo courtesy of Solar Aircraft Co.

Based upon highly successful use of RA 330 in other applications with temperatures ranging up to 2250° F., Solar Aircraft Company selected RA 330 for this critical application.

For best performance specify RA 330 for your heat treating fixtures and furnace parts.

Rolled Alloys Heat Resisting Alloy Specialists will gladly be of service. For technical data—send for Bulletin No. 107.

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Heat and Corrosion Resistant Alloy Specialists
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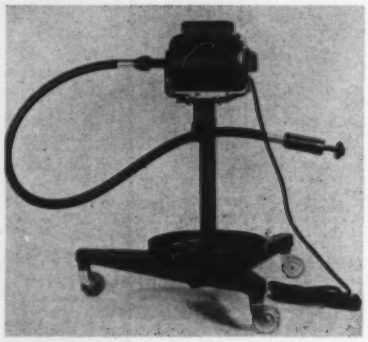
Flexible Shaft Unit Has Quick Change Attachments

ATTACHMENTS to the Lightning flexible shaft machine equipped with a quick-disconnect handpiece can be connected in seconds. A 5 or 6 ft flexible toolshaft is provided.



The bench height pedestal is convenient for bench work, grinding, brushing, or buffing operations. The unit operates at 1750 rpm (⅓ or ½ hp motor).

For further information, *write* Stow Mfg. Co., 63 Shear St., Binghamton, N. Y.

Refrigeration Unit Compact, Lightweight

A HERMETIC, centrifugal refrigeration machine, the Tonrac, is available in eight sizes from 50 to 100 tons (refrigeration capacity) and with dimensions compact

enough to pass through a standard, 36 in. wide, doorway.

The major significance of the centrifugal type unit is compactness, less costly building support requirements, and the elimination of field assembly and on-the-job hookup of auxiliary water piping, refrigerant piping and control tubing, says A. O'B. Andrews, Industrial Div. president. The unit uses an electric motor cooled by the liquid refrigerant to drive the compressor at 18,000 rpm. Mr. Andrews points out that the unit is estimated to weigh less than 1/10 as much as other designs.

For further information, *write* Industrial Div., American Radiator & Standard Sanitary Corp., Tireman at Roselawn, Detroit 32, Mich.

Arcwelder Has Simplified Controls

SIMPLIFIED controls for gas shielded and submerged arcwelding are featured on the Westinghouse RCP Industrial dc unit for semiautomatic and automatic operation.

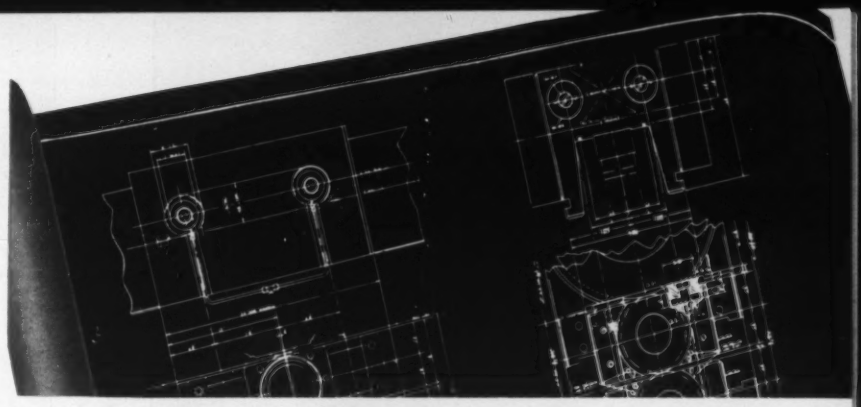
The company says the selenium rectifier power source (500 to 600 amperes) is designed to meet the demands of a majority of arcwelding processes in metalworking. The unit provides relatively flat volt-ampere characteristics for maximum arc stability in automatic and semiautomatic welding. Arc starting and recovery are practically instant and burnback and stubbing are reduced.

Other features include open circuit voltage control, weatherproof construction, and the Westinghouse de-ion lifeline starter welder control. The RCP welders may be connected in parallel or series to provide welding current or voltage as required. A 1 kva auxiliary transformer is part of the standard equipment.

For further information, *write* Westing-Arc Dept., Westinghouse Electric Corp., Buffalo 5, N. Y.

Rustproofing Oil Protects Parts in Process, Storage

AN IMPROVED, light duty, rustproofing oil developed by Enthone is designed to provide temporary protection to parts in process, in



Blueprint of a new process

by "YOUNGSTOWN"

One of Many Major Developments for Industry during 75 YEARS of Service

Have you heard about Work Roll Shaping? It's a unique method for assuring uniform flatness of steel strip. Reports from users of installations already in operation indicate remarkable results. This is just one of the recent "Youngstown" developments which improve rolling mill operations. Complete information will be furnished, without obligation, on any of the following:

- *Hydraulic Work Roll Shape Control*
  Improves the quality of strip—economically
- *Automatic, Heavy Duty, Contour Roll Lathes*
  Modern design for templet or numerical control
- *New Carriage-Type Stretcher Levelers*
  Sizes from 10,000# to 4,000,000#. Fast, efficient
- *500 fpm—81" Sheet Scrubber Line*
  Cleans sheets up to 76" wide and .250" thick
- *New Rotary-Type Plate Scrap Chopper*
  Unique reciprocating design prolongs knife life
- *Coil Processors and Scale Breakers*
  New concept of coil processing and scale breaking

Other recent contracts range from complete turnkey installations to auxiliary components. Whatever the need—large or small—you benefit from "Youngstown" experience.

THE YOUNGSTOWN FOUNDRY & MACHINE CO. 75 SERVING INDUSTRY SINCE 1886

The Youngstown Foundry & Machine Co.

Youngstown 1, Ohio

40

storage, or during shipment.

Plain carbon steel dipped in the full strength organic liquid (Entek RPO-12) will withstand 40 hours of exposure to salt spray (using Federal Test Standard No. 151) or more than 45 days of exposure to tropical humidity tests (100 per cent humidity at 100° F). In addition, the company says the material is ideal for use after blackening, dry or wet grinding, machining, sand blasting, tumbling of iron and steel parts, or to protect steel tools and dies when not being used.

The material may be applied by dipping, spraying, brushing, or tumbling. For maximum rust protection (up to one year) and optimum water displacing ability, the company advises using the material at full strength. Limited rust protection may be provided by diluting the material with safety solvent—1 part solvent to 1 part rustproofing oil by volume. The oil is not recommended for protection against outdoor exposure. It has shown superior resistance to moist acid and alkaline fumes from pickling and aluminum etching solutions, says the company.

For further information, *write* Enthone Inc., 442 Elm St., New Haven 8, Conn.

Plastic Journal Bearings Withstand Heat, Cold

PLASTIC journal bearings that function efficiently at temperatures up to 600° F and in the cryogenic range have been fabricated from Duroid 5813, a reinforced Teflon of high lubricity.

Developed by Rogers Corp. for applications where lubrication is impossible or undesirable, the key advantage of the material is that dirt, fibers, or debris will not adhere to it. The company says the material is being successfully used as retainers for microprecision bearings.

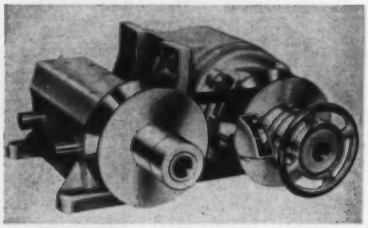
Bondable to metal, the plastic bearings can be used to replace worn inserts in machinery or without a metal backing as original equipment in new designs. While they can be bonded to any metal, dead soft metal grades are most satisfactory.

Other properties include a thermal expansion equivalent to aluminum, no cold flow problems, and no dimension change due to moisture.

For further information, *write* Rogers Corp., Rogers, Conn., or Smith & Klebes, New Britain, Conn.

Variable Speed Drive Rating Goes up to 10 hp

YOU CAN assemble 3, 5, 7½, and 10 hp drives with the 410 horizontal countershaft. The motor mounts at either side of the countershaft.



Lewellen variable speed pulleys provide an 8:1 range of speed variation. Manual or automatic regulators control speeds. The assembled drive can be installed on the floor, wall, or ceiling with shafts in horizontal or vertical position.

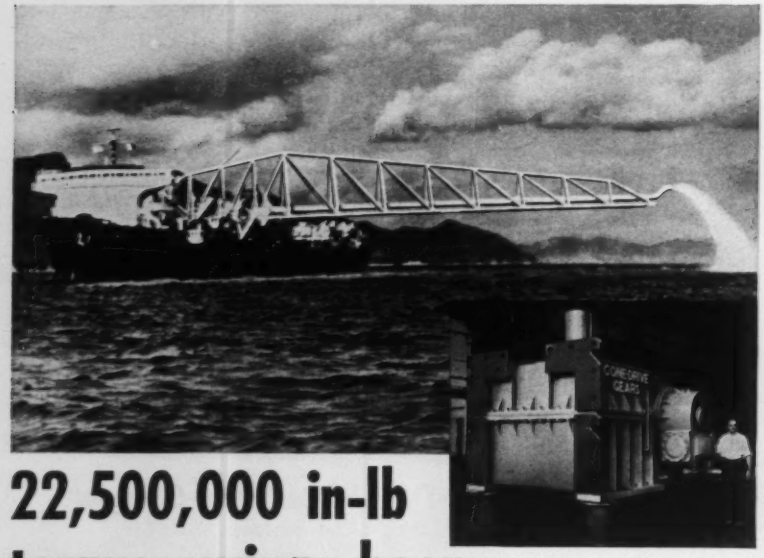
For further information, *write* Lewellen Mfg. Co., 1428 Tenth St., Columbus, Ind.

Automatic Indexing Unit Drills, Chamfers, Reams

AN AUTOMATIC indexing machine for drilling, chamfering, reaming, and tapping forged steel ells and tees in nominal pipe sizes to 1 in. has been developed by Swift Ohio Corp.

Using two spindles and machining two pieces at a time, the machine performs three operations: 1. Subland drills (high speed). 2. Reams—to locate accuracy of hole alignment. 3. Taps—using Scully-Jones, adjustable, floating tapholders.

Hourly capacity is two hundred



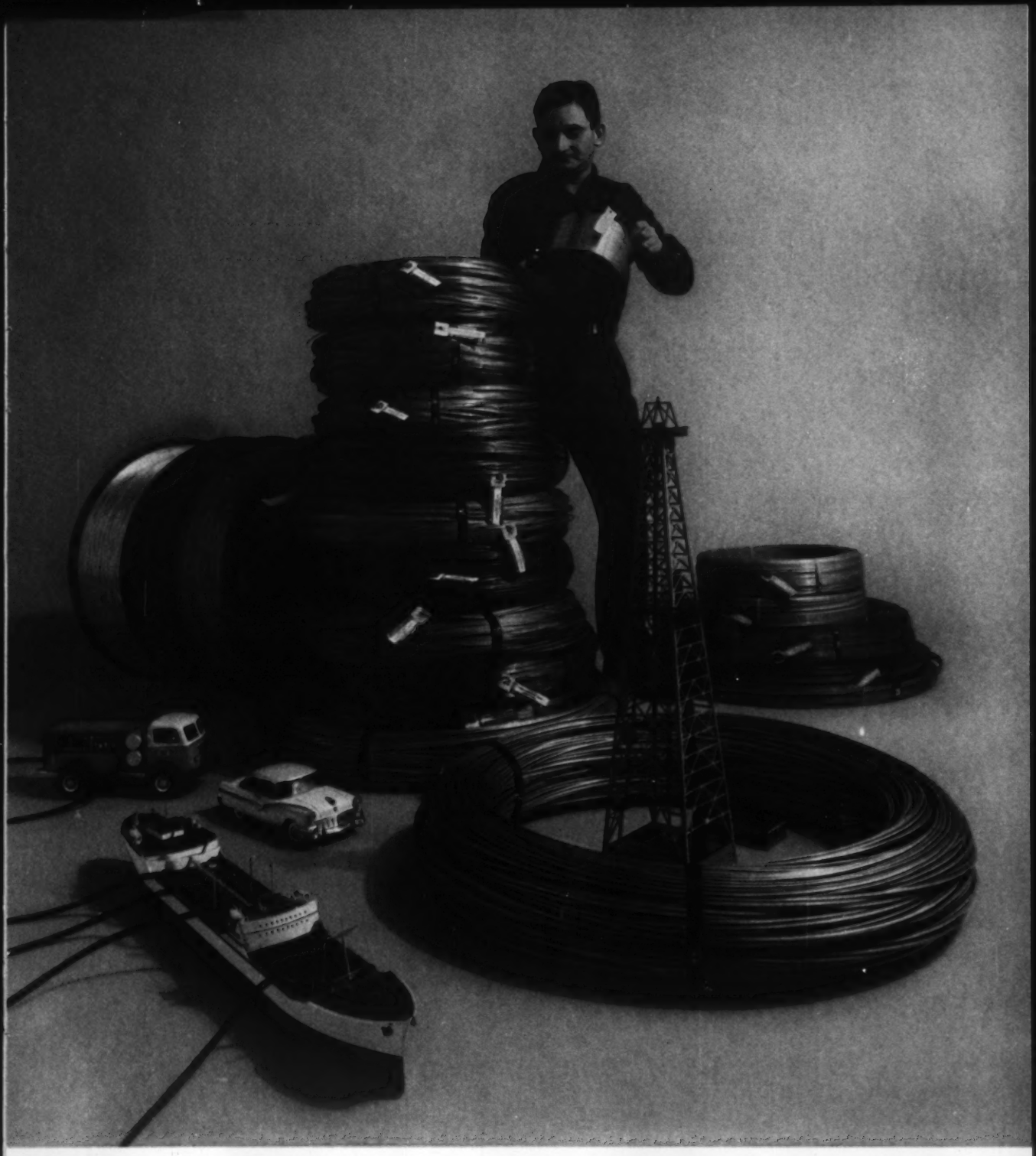
22,500,000 in-lb torque swings boom

This ocean-going dredge "Zulia" has a 437' discharge boom that rotates 180° to pump waste beyond a channel project's limits. The Cone-Drive speed reducer that does the job is shown in the inset. Due to the **double-enveloping worm** gear principle, this compact housing is capable of producing 22,500,000 in-lb torque—sufficient to "stow away" the giant boom in a 75 MPH wind.

Powerful Cone-Drive worm gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12



Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

Roebling...Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

13-2C

Low Cost Computer for the Steel Industry

A sophisticated low-priced control computer with capabilities ranging from simple logging to closed-loop control, the RW-330 brings you a new standard in flexibility. You can start with a small basic system that matches your current requirements and then add capabilities as you need them.

TRW Computers Company has successfully installed more digital control computers than any other manufacturer. Because RW-330 design is based on this experience, you are assured that an RW-330 system offers the greatest value per dollar in computer hardware – in flexibility, reliability, efficiency.

RW-330 FLEXIBILITY– Memory sizes range from 4,000 to over 100,000 words; analog input capacity from 0 to over 1,000; an optional subsystem permits automatic scanning and alarm functions to proceed independently of the computer's control program. A similar degree of flexibility is afforded by the RW-330's analog-output system, priority interrupt circuits, digital input-output equipment, fast-access storage, and command structure.

RW-330's are supplied in cabinets that match the application: rugged cabinets for harsh industrial environment, air purgable cabinets for hazardous environment, or standard control-room cabinets.

RW-330 CAPABILITIES – RW-330 computing speeds exceed those of competitively priced machines; addition instructions can be performed in 260 microseconds, including access time.

TRW Computers Company

a division of ***Thompson Ramo Wooldridge Inc.***

TRW

TO FIND OUT HOW THE RW-330 CAN BE APPLIED TO YOUR CONTROL PROBLEM, CONTACT ANY OF THE TRW COMPUTERS COMPANY OFFICES LISTED BELOW

220 North Canon Drive
BEVERLY HILLS, CALIFORNIA

1510 Esperson Building
HOUSTON, TEXAS

200 East 42nd Street
NEW YORK 17, NEW YORK

200 South Michigan Avenue
CHICAGO, ILLINOIS

3272 Peach Tree Road, N.E.
ATLANTA 5, GEORGIA

13-3C

The RW-330 in the Steel Industry

An RW-330 digital computer will control the basic oxygen furnaces at Great Lakes Steel Corporation, Detroit division of National Steel Corporation. Given raw-material data and end-product specifications, the RW-330 will compute and control additive requirements and control the flow rate and duration of the oxygen blow. By correlating data on finished ingot characteristics with records of furnace operation, the RW-330 will automatically determine the best set of operating conditions for subsequent batches. RW-330 control will minimize the consumption of raw materials and will ensure product quality.

An RW-330 can control many other conversion and finishing operations. It can be applied to any control job — large or small — and you pay for only as much computing and control capacity as you need because the RW-330 is flexible in size. You can later expand your system for data logging and closed-loop control of additional plant operations.

The RW-330 is ideal for an "evolutionary" control system. The basic computer provides you an economical means of gathering and interpreting data on the operation of a specific process. From this information, a closed-loop control system can be developed, and your RW-330 can be expanded to do the job while gathering information on other processes. Thus, RW-330 expandability gives you a gradual, or evolutionary extension of automatic control.

Investigate the RW-330 in the light of your own requirements today.

TRW Computers Company

a division of Thompson Ramo Wooldridge Inc.

8433 Fallbrook Avenue, Canoga Park, California

NEW PRODUCTS and equipment

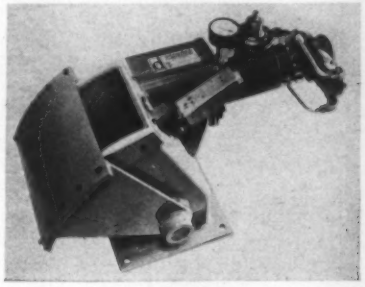
3/8 in tees and ells, steel forgings, high pressure fittings and three hundred 1 in. tees and ells, steel forgings, and high pressure fittings with ±0.005 accuracy of line holes.

The basic machine includes a six station, 84 in. diameter, indexing table; wing bases, columns, non-rotating center table top; and two spindle and special power drilling units for mounting on the table top. It also has three special tapping units, a hydraulic power unit and valves, coolant system, six dual spindle heads, bushing plates, and brackets.

For further information, *write* Swift Ohio Corp., Kenton, Ohio.

Swing Gate Feeder Moves Free Flowing Materials

A SWING gate feeder for free flowing materials controls movement into automatic weighing systems or continuous process streams.



The unit is available with a two position, full on-off control, or with a modulated feed control to obtain full flow to cutoff with modulated response. It's a heavy duty unit, self-cleaning, and can be obtained in a wide range of flow rates.

For further information, *write* Dynametrics Corp., Northwest Industrial Park, Burlington, Mass.

Sensitive Instrument Monitors up to 10 Points

AN INSTRUMENT called the Thermo electronic economy monitor is said to provide accurate, sensitive, low cost monitoring of one to ten points to be checked for the same value.

Applications include monitoring temperature, pressure, speed, pH, flow, or any process variable measurable by transducers generating dc millivolt outputs, or changes in resistance.

The unit is available with a null balance potentiometer or bridge type measuring circuit and a ten point scanning mechanism. Each point to be monitored is scanned in sequence and its value compared with a pre-established setpoint. High or low deviations (from setpoint) at any of the monitored points will cause the unit to give a visual indication and shut down the process or processes involved.

For further information, *write* Thermo Electric Co. Inc., Saddle Brook, N. J.

Fine Finish Produced By Broaching Machine

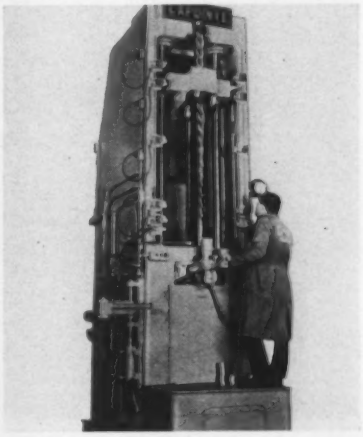
NO CHATTER and the substantially improved surface finish are advantages of a broaching machine designed by Lapointe. The setup uses a pair of matched ball screws to pull the broach, with the broach and the twin screws arranged for direct in-line pull. A broach following attachment gives added stability by guiding throughout the full cutting stroke.

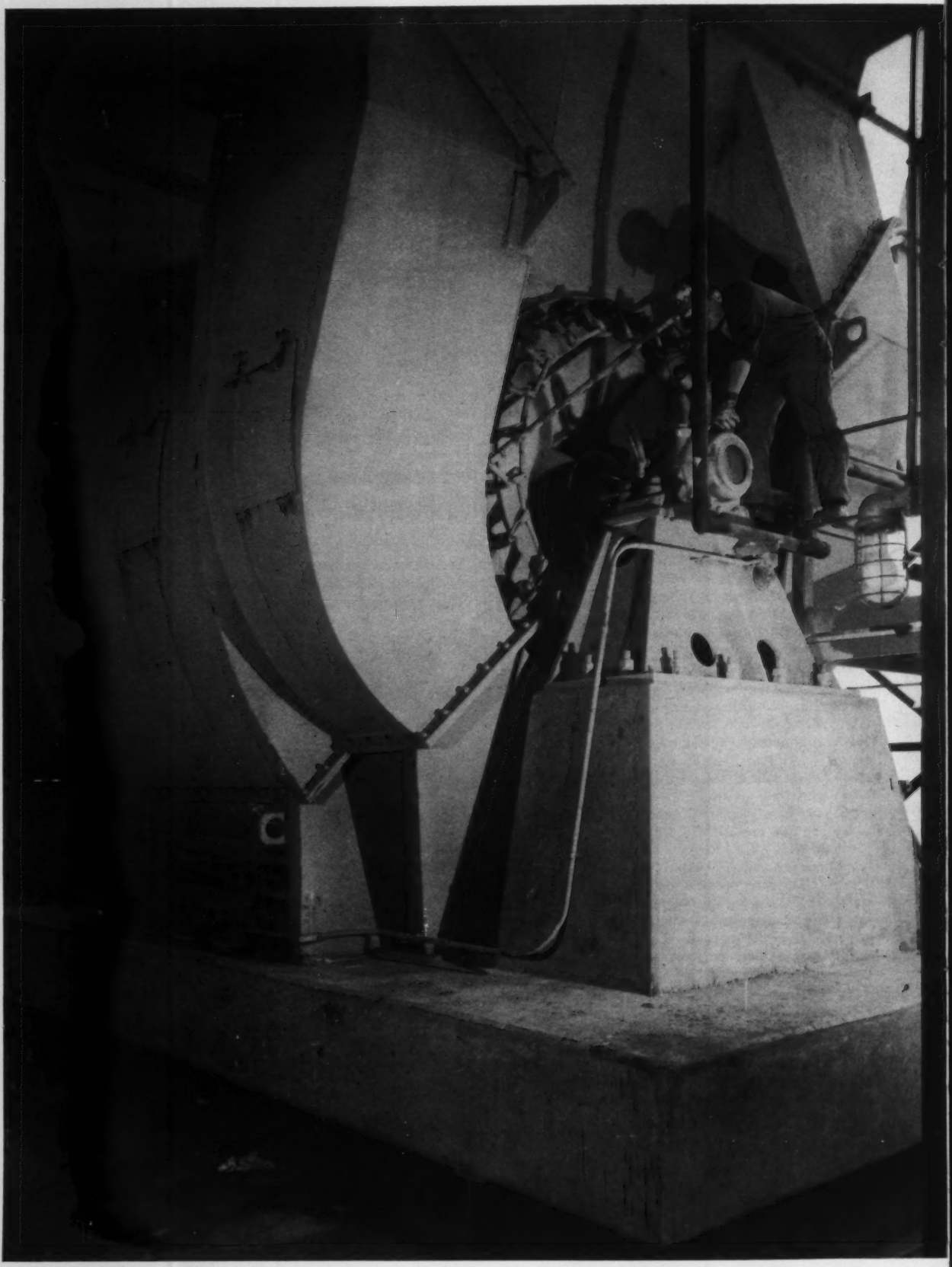
The machine is Lapointe's Model VUE-4.

It's powered by a 30 hp, electro-mechanical drive.

Joseph P. Crosby, vice president-sales, says that one gear manufacturer plans to eliminate his final gear shaving operation because of

(*Please turn to Page* 94)





RD Fan used for induced draft on basic oxygen furnace of large steel producer. There are four identical units, each producing 325,000 cfm against a static pressure of 15" wg at 550° F.

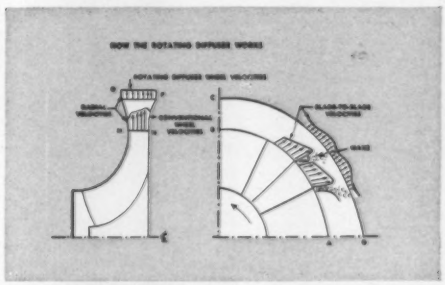
JOY RD FANS CAN PROVIDE PRESSURES UP TO 4.5 PSI AND CAPACITIES UP TO 600,000 CFM

Joy RD Centrifugal Fans, based on a new concept in fan design, can provide any volume of air or gas at pressures up to 4.5 psi in a single stage. This means important savings in initial cost. An equally important saving is their high efficiency over a wide range of volume, which is especially important where load fluctuates. Surging, even on parallel operation, is no problem because the RD Fan is inherently resistant to pressure surge over its entire duty range.

These advantages of the RD Fan are the results of its unique rotating diffuser. Instead of stationary diffusers, the RD diffuser is an integral part of the wheel—added at the blade tips. The rotating diffuser reduces the gas velocity before leaving the wheel and up to 98% of the conversion of velocity to pressure is accomplished with the wheel of the RD Fan.

Radial blades in the RD Fan tend to be self cleaning, even when handling dust laden and dirty gases. The rotating diffuser results in low noise levels because of the lower and more regular velocities leaving the wheel and because the blade tips are remote from the cut-off.

The Joy RD Fan is finding steady acceptance in induced draft and forced draft applications in the steel and power industries, in handling chemical process gases, and in heavy duty industrial applications. For extremely dirty or corrosive applications the entire unit may be fabricated of stainless steel. Parts are simple because there are no large castings or close running tolerances. For complete information and duty areas of the RD Fan, write for bulletin 3449-72.



HOW THE ROTATING DIFFUSER WORKS

Studies have shown that radial velocities leaving conventional wheels are unequally distributed, as shown in MN. Also there is fluctuation in the blade-to-blade velocities based on $\frac{nN}{60}$ where n is the number of blades and N is the speed in rpm. The Rotating Diffuser reduces the gas velocity before leaving the wheel, which allows more uniform flow as shown at OP and CD. Without the rotating diffuser, velocities are much higher and erratic as shown at AB and MN, causing turbulence, friction losses.

Joy RD Fan at eastern CO_2 plant. Unit has capacity of 27,800 cfm, at 3 psi. Drive is a 450 hp steam turbine.

AIR MOVING EQUIPMENT FOR ALL INDUSTRY

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

NEW PRODUCTS and equipment

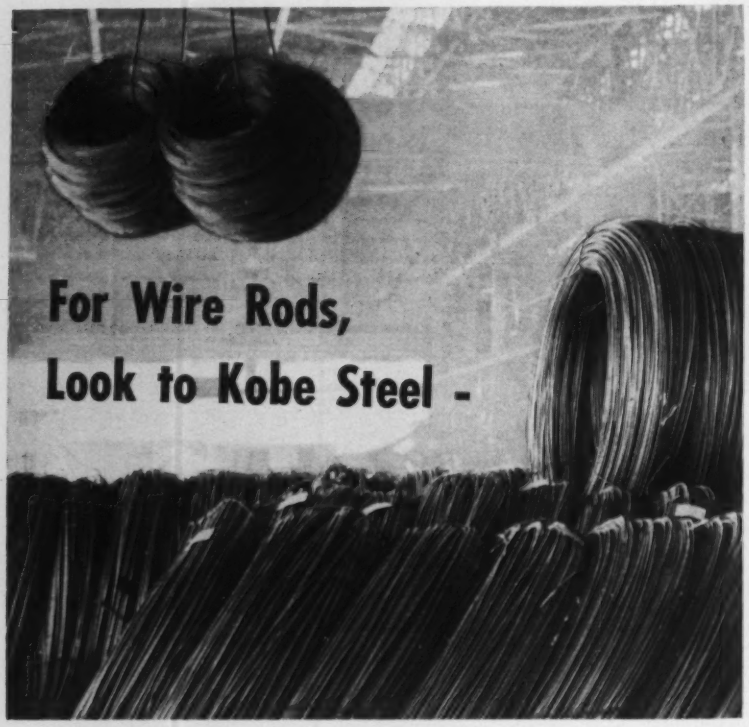
(*Concluded from Page* 91)

the smoothness and accuracy of the Lapointe machine. Mr. Crosby feels that there are a great many other applications where the broaching principle will eliminate finishing operations. In addition, the absence of chatter is said to provide 50 per cent or more improvement in tool life.

The machine shown has a 72 in. stroke and was developed to broach an automotive pump gear. Pushbutton electrical controls provide manual, semiautomatic, or automatic operation and an independent auxiliary hydraulic system operates the fixture and broach lifter mechanism.

The machine is built to operate at infinitely variable speeds, from 5 to 40 fpm. A dual speed feature permits changing the broaching speed automatically at any predetermined point in the broaching stroke.

For further information, *write* Lapointe Machine Tool Co., Hudson, Mass.



with 35 years of experience in the production of mild steel wire rods, and a proud record of being the first to produce hard steel wire rods in Japan over 30 years ago.

Kobe Steel, with the complesion of its new No. 5 mill in June of 1961, now has production capacity of 740,000 tons annually and is known as the oldest, largest and most versatile manufacturer of steel wire rods in the Far East.

Particularly famous for the high quality of its hard steel and special steel wire rods, Kobe Steel exports to every major area of the world.

KOBE STEEL WORKS, LTD.

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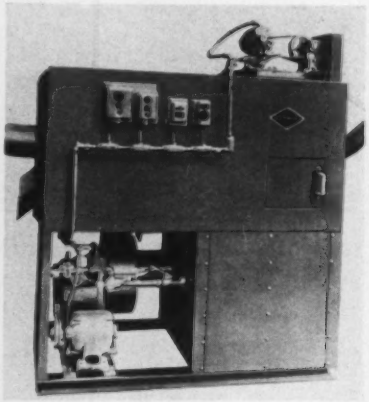
New York Office: 80 Pine St., New York 5, N.Y., U.S.A.
Düsseldorf Office: Immermann St., 10, Düsseldorf, West Germany

Main Products: Wire Products — Plain and Galvanized Iron Wire • Barbed Wire • Wire Nail • Wire Rope • Strand Wire for Prestressed Concrete • Bars, Pipes and Tubes • Arc Welding Electrodes • General Machinery

Rotary Drum Unit Dries Production Lots

DESIGNED especially for mass production drying in the plating industry, a rotary drum type drying unit produced by Alvey-Ferguson handles miscellaneous small parts in bulk form after plating.



A 24 in. diameter drum is gas heated. Recirculated hot air is provided.

For further information, *write* Alvey-Ferguson Co., 3131 Disney St., Cincinnati 9, Ohio.

Self-Adhering Teflon Tape Resists up to 400° F

CONTINUOUS use at 350° F and short time use up to 400° F are claimed for a pressure sensitive Teflon tape. It's designated Type IT and consists of a laminate of Dilectrix Type S Teflon film bonded to a high tack adhesive layer.

Because Type IT is not chemically etched, the company says that electrical, chemical, and mechanical characteristics of Teflon are maintained. The tape will adhere to glass, metals, wood, ceramics, and other surfaces.

The nonstick outer surface and chemical inertness make the material suitable for chute linings, conveyor belt surfaces, table coverings, and other facings. Other suggested uses: Gasket facings and cap liners for corrosive chemical confinement. Widths range from 1/4 to 12 in. in increments of 1/8 in.

For further information, *write* Dilectrix Corp., Allen Boulevard & Grand Avenue, Farmingdale, N. Y.

Lubricant Additive Safe For Aluminum Wrapping

BY PREVENTING lubricant breakdown, Nopco 9390 additive permits continuous rolling of aluminum foil and sheets to consistent gage or thickness, and to a uniform, fine surface finish, says Nopco Chemical Co. The company says the product is also useful in drawing, extruding, stamping, and machining of aluminum.

The ingredients of the additive comply with the requirements of the U. S. Food & Drug Administration.

Nopco 9390 is generally recognized as safe for use in food wrappings, says the company.

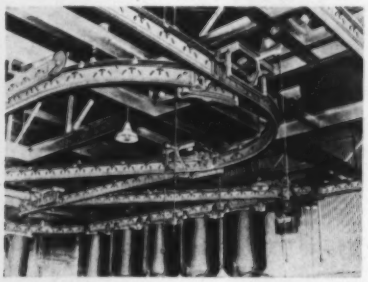
For further information, *write* Metal Processing Dept., Industrial Div., Nopco Chemical Co., 60 Park Place, Newark, N. J.

Track Takes Heavy Loads

A HEAVY DUTY track for overhead material handling service is a compound section consisting of a steel flange and web and a specially rolled, high carbon, alloy steel rail.

The company says the parts are welded continuously from end to end under carefully controlled conditions to form a combined section free of stress concentrations.

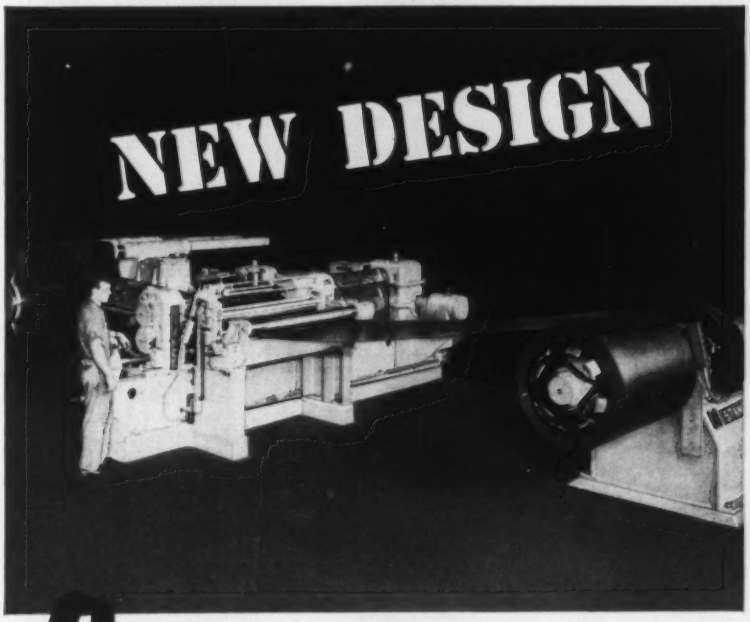
The high strength rail has a hard, flat, raised thread or running surface. The tread is smooth and becomes highly polished in service. No peening down occurs. A ball and socket swivel connection forms a flexible suspension system for the track. Called Tarca, the track is made in a large number of standard sizes ranging from 8 to 20 in. deep. Special sizes and greater depth tracks can be furnished. The dimensions match existing Cleveland Tramrail track dimensions (permitting extension of all systems now in service).



The manufacturer says Tarca track is especially suitable where distances between track supports are great. For most situations with such limitations, the track reduces or eliminates the need of a specially engineered structural framework. For example, when the track is used on crane bridges, single girder, 3 ton cranes, or double girder, 5 ton cranes can be made for operation on runways with tracks spaced up to 100 ft centers.

Standard deflection is said not to exceed 1/450th of the span. For applications with spans about 50 to 60 ft between supports, a ratio of 1/600th is normally used. The tracks can be used for hand power or electrified switches. Systems can be developed for nearly every handling situation requiring straight or curved tracks for loads up to 20 tons. Standard tracks are available in lengths to 60 ft.

For further information, *write* Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.



Stamco equipment...cuts costs

Unit will handle coils of 20 thousand pounds maximum weight with a maximum width of 52 inches. Attractively priced. Contact our specialized sales representatives for complete information.

Stamco, Inc.
New Bremen, Ohio, U.S.A.

Slitting and Cooling Lines • Cut-to-Length Lines • Flying Shear Lines • Power Squaring Shears • Continuous Process Lines • Ferrous & Non-ferrous Mill Equipment

District Offices, Stamco Sales, Inc.
R. P. Popp, 18450 Livernois, Detroit 21, Michigan
R. P. Popp, 101 Investment Building, Pittsburgh 22, Pa.
I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

NEW literature

Write directly to the company for a copy

Hydrogen Generation

How metallic hydrides can be used for generation of hydrogen through interaction with water is explained in Technical Bulletin No. 511. Metal Hydrides Inc., 12-24 Congress St., Beverly, Mass.

High Temperature Alloys

Literature published by Allegheny Ludlum presents information on high temperature, high strength alloys. A leaflet is provided on each of a series of steels and alloys. A 28-page general booklet covers high temperature alloys. Advertising Dept. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

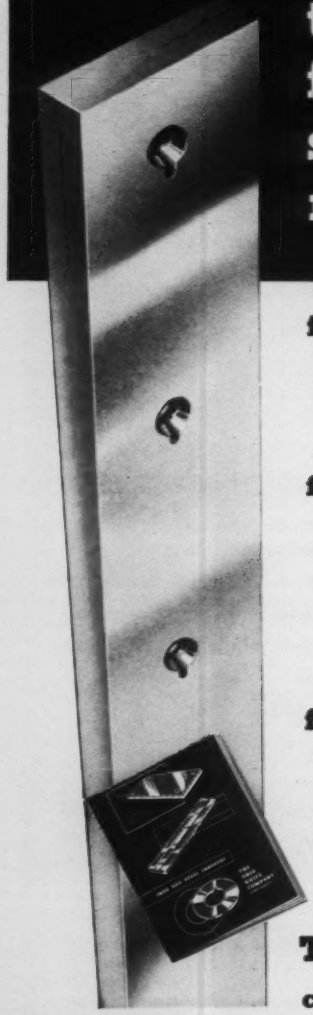
Aluminum Oxide Removal

Chemical removal of high resistance oxide films from aluminum is discussed in an eight page booklet. It probes the variables of resistance welding and points out that uniformity of resistance is more important than resistance limits. Also presented are outlines for several specific weld preparation procedures and suggestions for getting the best welding results. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

save time and money

OHIO KNIFE CO.

the one source for all your shear blade requirements



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Save on inventory! We carry in stock for immediate delivery, blades for all makes of square shears. You also save because our blades last longer between regrinds.

for all shearing

OK BATTLE AXE grade for shearing up to and including ¼" mild steel or equivalent.

OK DURA-CHROME grade for shearing hot or cold plate up to 1½" or equivalent.

OK UTILITY grade for heavy short runs and heavy plate.

for any shear

Our blades are used as standard equipment by shear builders. They are also purchased as replacements by users when ordinary blades wear out.

For FREE 8 page Bulletin-C, write Dept. 132-AF

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

Acidproof Cements

A bulletin contains a list of more than 75 corrosive solutions and a rating for the various types of acidproof cements at temperatures of 75 and 140° F. Acid-Proof Cement Manufacturers Association, 1015 Chestnut St., Philadelphia 7, Pa.

Properties of Plastics

Properties of eight plastics are discussed and compared in a four page brochure, illustrated with 12 bar graphs. The plastics mentioned include Delrin, polycarbonate, polypropylene, high density polyethylene, and Nylon 6. Cadillac Plastic & Chemical Co., 15111 Second Ave., Detroit 3, Mich.

Rust Control

The control of rust during production operations is discussed in an eight page guide. It details causes of rust, factors vital to successful rust control, specialized rust prevention products, and gives tips on selection. Magnus Chemical Co. Inc., M-88-35 South Ave., Garwood, N. J.

Security Services

A handbook published by Pinkerton's National Detective Agency reviews professional services that security agencies can handle. The booklet contains 13 case histories. Pinkerton's National Detective Agency Inc., 100 Church St., New York 7, N. Y.

Hot Dip Galvanizing

Corrosion Resistance of Hot Galvanizing is the first in a series of technical booklets on the subject and is intended to give engineers, architects, and designers up to date and accurate information on the performance of hot galvanized coatings in various environments. The advantage of using heavy coatings to obtain more complete protection against rust is stressed. Hot Dip Galvanizers Association, 34 Berkeley Square, London W. 1, England.

Neutrons from Tubes

A folder, "Neutrons from Small Tubes" discusses tubes which provide neutrons in quantities intermediate to those available from isotopic sources and reactors. Philips Electronic Instruments Div., Philips Electronics & Pharmaceutical Industries Corp., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Resistance Alloy

Properties and performance characteristics of Hoskins Alloy 750 are presented in a technical bulletin. The bulletin also contains helpful information and recommendations for designing, fabricating, and welding coiled heating elements made of the material. Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich.

Flexible Pipe Guide

Included in a flexible pipe connector guide (Manual AM-9) are sections discussing proper installation. A checklist is provided to help in designing for optimum service life. Allied Metal Hose Co., 3746 Ninth St., Long Island City 1, N. Y.

Look for Upturn in Shipments

LOOK FOR August steel shipments to top July's in spite of delivery postponements some automakers have been requesting. There's enough new strength in other markets to make up for the deferred automotive business.

Nevertheless, steelmakers are disappointed. Says a major producer: "Until ten days ago, we thought our August bookings might be the best of any month this year—thanks to some big orders from the auto companies. Then deferments rolled in, and the bottom fell out. We still expect to ship more steel this month than we did in July, but we've given up hope of beating June's figures."

AUTOMAKERS CAUTIOUS— In Detroit, the attitude seems to be one of watchful waiting. Automakers have enough steel on hand or in transit for August—industry output is expected to be only 180,000 cars vs. 400,000 in July—and they don't want to release more orders until they can be sure there won't be a strike. But even if they avert a walkout, they don't expect to get into full production of new models as quickly as they originally estimated. Result: They're asking steelmakers to hold back some August tonnage until September.

GRADUAL UPTREND— Until automotive demand picks up, steelmakers expect only a gradual uptrend in their operations. Their August production will be no more than 8.3 million ingot tons vs. 8.1 million in July. As long as steelmakers can give fast deliveries, customers have no incentive to order ahead or build inventories. There's no evidence that buyers are hedging against the possibility of an October price hike.

SIGNS OF STRENGTH— Although the next few weeks won't bring much improvement in steel demand, the outlook for the fall is promising. Optimists note: 1. New car sales in the middle third of July were the highest for that period since 1955. If sales continue at that pace, dealers won't have trouble with the 1961 model cleanup. 2. Factory sales of home laundry appliances in June were 7 per cent higher than those of June, 1960. 3. Foreign orders for machine tools in June hit their highest point since early 1951. 4. Construction contracts awarded in June were 4 per cent above those in June, 1960. Total awards for the first six months of 1961 were $18.2 billion vs. $17.6 billion in the like period of 1960.

PRICE HIKE PREDICTED— As the time draws near for steelmakers to give union members another wage hike, more buyers are betting that steel prices will be raised simultaneously.

In its July report, the National Association of Purchasing Agents said members expressed "apprehension over price policies of venders who have experienced wage and raw material cost increases and have not yet passed them on in the form of higher prices."

At a Chicago press conference, members of the executive committee of the Steel Service Center Institute said they expect steel prices to be raised selectively in the fall.

In speaking about the need for higher prices, Arthur B. Homer, chairman, Bethlehem Steel Corp., declared that if conditions in the fall point to an increase he would not be deterred by "feelings expressed in Washington."

PRODUCTION INCHES UP— Look for ingot production in the week ending Aug. 12 to be slightly higher than the 1,790,000 tons that STEEL estimates the industry poured in the week ended Aug. 5. Output then was 1.5 per cent below the previous week's.

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*Current prices were published in the July 31 issue and will appear in subsequent issues.

STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					4th Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT-ROLLED CARBON BARS	10%	26%	49%	14%	1%	11%	74%	15%
COLD-FINISHED BARS	10%	28%	46%	15%	1%	6%	85%	9%
H & C-R SHEETS, STRIP	14%	14%	52%	14%	6%	12%	76%	12%
LIGHT PLATES	6%	19%	50%	22%	3%	23%	66%	11%
HEAVY PLATES	6%	21%	44%	23%	6%	18%	70%	12%
STRUCTURAL SHAPES	9%	15%	56%	20%	—	13%	78%	9%
COPPER & BRASS	15%	18%	41%	26%	—	9%	80%	11%
ALUMINUM	12%	9%	46%	21%	12%	19%	62%	19%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Buyers Oppose Inventory Buildup

Three-fourths of respondents to STEEL poll plan to maintain stocks at present levels. But delivery complaints and longer leadtimes are beginning to show up again

NO BUILDUP of ferrous and nonferrous mill products stocks has accompanied the economic upswing and none is in sight this year.

"We'll maintain inventories at the present level," say 75 per cent of the respondents to STEEL's quarterly survey of metals buyers.

That is the most solid support given the status quo in more than three years.

Although inventory reductions have tapered off, buyers are not yet ready to start buying for stockpiling. The 12 per cent who plan to add to their stocks may just offset reductions still planned by 13 per cent of the buyers. Overstocks of various items are reported by 19 per cent of the respondents, the highest percentage since last November.

• **Delivery Problems** — Complaints about deliveries (5 per cent) are more numerous than they have been since May, 1960. One West Coast purchasing agent observes, "Some promises are proving unreliable and longer leadtimes are required." If delivery problems become more widespread, buyers who are not planning to raise their inventory levels may get caught short. And the situation could be complicated overnight if steel and aluminum price hikes appear more likely later this summer.

• **Stock Trimming**—In the last three months, 68 per cent of the buyers held their inventories steady, 24 per cent made reductions, and only 8 per cent made additions.

Heaviest reductions were in supplies of hot and cold rolled sheets and strip and structural shapes. There still are more buyers who plan reductions than those who will build stocks of those items, but the margin has narrowed considerably.

The only buildup was registered in cold finished bars, but 85 per cent of the buyers favor keeping those stocks at the present level.

• **Current Picture**—The breakdown of general inventory: Under 10 days, 11 per cent; 10 to 30 days, 20 per cent; 30 to 60 days, 47 per cent; 60 to 90 days, 19 per cent; three to six months, 3 per cent.

Since STEEL's last survey (May 1, p. 82) there has been a slight shift in the 30 to 90 day levels. A reduced number of companies are in the 10 to 30 day and three to six month brackets. Those with less than 10 days' supply remained the same.

Allegheny Ludlum Raises Stainless Strip Capacity

Allegheny Ludlum Steel Corp. is increasing its capacity to produce bright annealed, stainless steel strip with the addition of a second, vertical, continuous annealing furnace at its West Leechburg (Pa.) Works. The furnace is scheduled for operation during the fourth quarter and will produce strip up to 27 in. wide and in gages somewhat heavier than can be turned out with earlier furnaces.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 105 & 106

Cold rolled sheet buying is edging upward. Demand for galvanized sheets is still active, and some improvement in specialties, such as electrical sheets and enameling stock, is noted.

Order leadtime on flat rolled products, except galvanized sheets, remains at the minimum. Not much change is likely until September.

Hot rolled sheets are quoted for delivery in two to three weeks; cold rolled sheets, two to five weeks. Promises on galvanized sheets continue to be well extended; some producers have little to offer before mid-October.

Demand from farm equipment makers is somewhat weaker than it was—due partly to seasonal influences and partly to slower buying by farmers because of the drought in the western plains.

Consumers in New England show little interest in fourth quarter requirements. There is agreement that needs for the fourth quarter will be heavier, but prompt deliveries on most grades are still working against forward buying.

Steel Service Center Executives Forecast Continued Sales Gains

STEEL SERVICE centers look for a mild improvement this month, but anticipate no real spurt until after Labor Day. Sheets and light structurals are moving best at this time.

At a meeting of its executive committee in Chicago, July 28, the Steel Service Center Institute reported that despite an increase in plant-wide vacation shutdowns in some major industrial areas in July, shipments by distributors declined less in July from June than industry leaders had anticipated.

• **Demand Improves** — Robert G. Welch, executive vice president, said: "Apparently the improved business is coming from all segments of the economy. If it continues, the industry's volume may be considerably better in the third and fourth quarters than the improvement we now anticipate for the current half year."

While July business was about 12 per cent below that in June, that was largely accounted for by fewer shipping days in July (19 against 22 in June). The volume for July was ahead of the same month of 1960. On a day-to-day basis, the industry's July shipments ran even with June's.

Shipments by steel service centers have shown modest increases each month during 1961, although at the end of the first half they were 15 per cent below the figure for the first half of 1960, largely because of the abnormally high rate of activity in early 1960 following settlement of the steel strike. During that period, inventories were expanded to levels far beyond normal.

President R. J. Heggie, A. M. Castle & Co., said he anticipates third quarter volume this year will be slightly ahead of that for the preceding period, with the fourth quarter exceeding both second and third quarters.

• **Forecasts**—Consensus of members of the industry is that their sales in the second half of 1961 will be 15 per cent higher than in the second half of 1960. Result: The 1961 total is expected to equal or slightly exceed shipments for the previous year.

Some industry leaders are more optimistic. They predict an increase in shipments for the entire year of 10 to 12 per cent. They back up this optimism by citing four major factors: 1. The greater emphasis on conventional weapons which contain substantial quantities of steel. 2. Potential business in the machine tool and heavy equipment industries where purchases are being delayed pending announcement of possible depreciation reforms. 3. Hedge buying in anticipation of a possible price increase. 4. The likelihood of a build-up of inventories by metal fabricating plants.

• **Stocks Gain**—Inventories of industrial steel products in service centers, amounting to 2.8 million tons last March, have moved up about 50,000 tons each month since then to the 3 million ton level on June 30. They remained at the latter figure during July. Industry leaders expect a modest inventory buildup in the third quarter.

• **Price Outlook**—Several steel service center institute directors think there will be selective increases in steel prices as mills meet the Oct. 1 wage hike. They see little alternative as mills become faced with higher costs. It was pointed out that structurals likely would be one of the first products to be boosted because they are not lucrative at present. There was also agreement that as steel prices are increased, service centers will pass the increases along to their customers.

Regarding price advances, some observers of the steel industry feel that the present world tensions may bolster administration hopes for holding the price line.

Distributors . . .

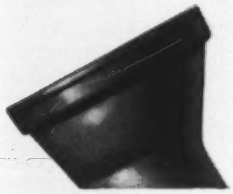
Prices, Page 109

American Steel Warehouse Co. is constructing office facilities adjacent to the Portland, Oreg., warehouse

(*Please turn to Page* 102)

FOR THE MACHINERY PART

THAT TAKES THE BEATING



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HAYNES STELLITE COMPANY
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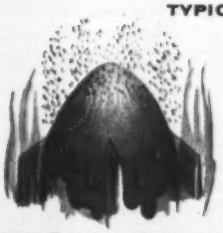
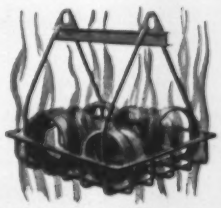
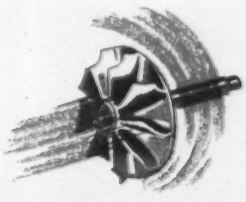
TYPICAL "HAYNES" ALLOY PARTS THAT RESIST...



ABRASION. Ten times the life and still no sign of wear, is the record of this plastics-extrusion torpedo nose made of HAYNES STELLITE alloy No. 3. This is one of many HAYNES wear-resistant alloys.



CORROSION. Baskets made of HASTELLOY alloy C used for holding forgings during acid treatment, are still good after 15 months of service. Materials formerly used were replaced every month.



HIGH TEMPERATURE. Turbine wheels in the "hot" ends of diesel engine turbochargers are investment-cast of HAYNES STELLITE alloy No. 31, for service at speeds up to 50,000 rpm. at 1500 deg. F.

(*Concluded from Page 99*)

which the company purchased in 1953 in anticipation of expansion. Cost: $200,000.

Upon completion of the offices in December, American Steel will have 140,000 sq ft of warehouse and office space compared with its present area of 50,000 sq ft. The facility will become the central branch and depot for the company's three southern branches: American Steel & Supply, Eugene and Medford, Oreg., and Coast Steel & Supply, Redding, Calif.

Upon moving to the new location, the company will expand its product lines and will add new lines of steel and mill supplies. It will install more than $100,000 worth of steel handling equipment.

Ferroalloys . . .

Ferroalloy Prices, Page 111

Koppers International C. A., a subsidiary of Koppers Co. Inc., Pittsburgh, has received a contract from Acoje Mining Co., Manila, Philippines, for a ferrochrome plant to be built near Iligan on the island of Mindanao.

The plant will utilize the Strategic-Udy direct reduction process, under license from Strategic Patents Ltd., a subsidiary of Strategic Materials Corp., New York. Production of ferrochrome should commence about 15 months after construction of the plant begins.

Steelmaking Operations Decline

Steel ingot production is the lowest it has been since the week ended June 22, excepting the July 4 holiday week. Production for the week ended Aug. 5 is estimated by STEEL at 1,790,000 tons, a decline of 1.5 per cent from the preceding week's 1,818,000 tons.

Despite the recent downtrend in output, most producers anticipate better business in August than they had in July and more improvement in September. The Commerce Department predicts the steel industry's fourth quarter will be the best since the first quarter of 1960 when production zoomed following the steel strike.

The rate of improvement will hinge mainly on automotive requirements, which in turn will depend on the outcome of labor negotiations in the auto industry. If a strike is avoided, automotive tonnage will run heavy and will have a stimulating effect on other consuming lines. But a sharp, over-all boom is not expected.

Improvement will be aided by good construction activity, a pickup in capital goods spending, and a betterment in appliance demand. The President's defense buildup may also have some influence—but probably not much before next year.

● **Youngstown**—Steelmaking operations here fell 1 point during the week ended Aug. 5 to 51 per cent of 1960 capacity. Republic Steel Corp. took off one open hearth at its Youngstown Works. Some plants are making up orders that aren't for shipment until late August in an effort to keep units going without temporary cutbacks until demand improves.

● **Buffalo**—After a long stalemate, steel production here moved ahead a notch during the week ended Aug. 5. An idle open hearth was reactivated at Bethlehem Steel's mill, raising the district's rate to about 46.5 per cent of 1960 capacity. It marks the first upturn in district operations in a long time, and steel mill executives hope it heralds the beginning of an upswing.

The national defense program appears to have had little effect on the buying policies of purchasing agents for metalworking companies.

● **Birmingham** — The steelmaking rate in the Birmingham-Gadsden-Atlanta district for the week ended Aug. 5 rose 3 points to about 67 per cent of 1960 capacity.

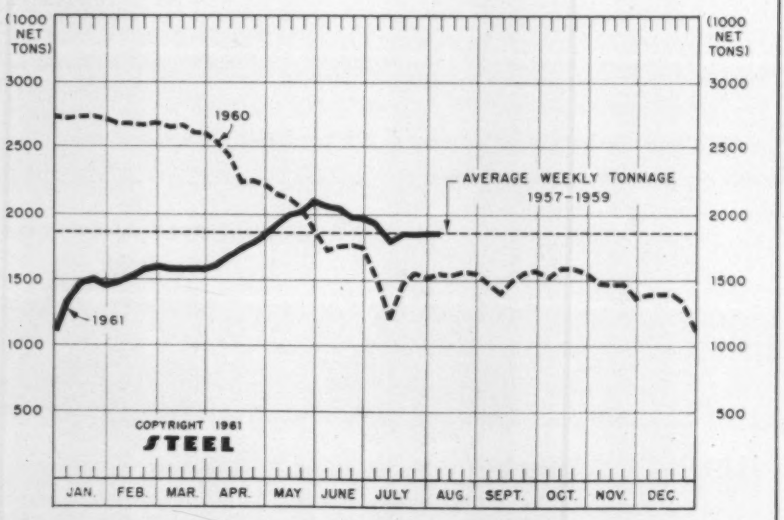
● **Chicago**—Operations for the week ended Aug. 5 declined 2 points to 70 per cent of 1960 capacity. Steel buying is quiet on all consuming fronts. Chiefly responsible is the lack of ordering by automakers. Not much change is expected for two or three weeks.

STEEL INGOT PRODUCTION

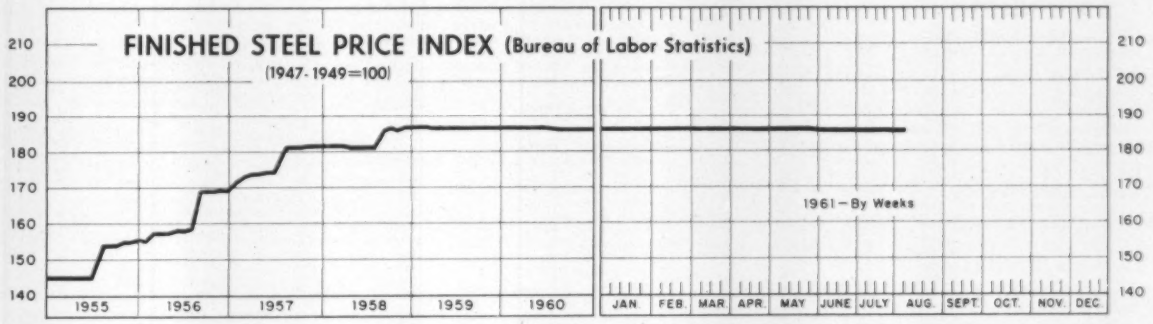
Weeks Ended	Net Tons	Change
Aug. 5	1,790,000*	— 1.5%
July 29	1,818,000	— 2.2%
July 22	1,858,000	— 0.1%
Totals to July 29		
1961	52,386,000	—20.8%
1960	66,135,000	

DISTRICTS	Week Ended July 29 Tons‡	Week Ended July 29 Index†	Week Ended July 22 Index†
Northeastern	264,524	99	96
Buffalo	76,910	79	84
Pittsburgh	355,123	88	88
Youngstown	147,883	87	89
Cleveland	91,669	99	102
Detroit	100,720	96	117
Chicago	392,780	105	107
Cincinnati	87,470	116	117
St. Louis	57,805	110	107
Southern	113,816	105	103
Western	130,943	112	117
Industry	1,818,000	97.6	99.7

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Aug. 1, 1961	Week Ago	Month Ago	July Index	Year Ago
185.6	185.6	185.6	185.5	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	193.030
		Casing, Oil Well, Alloy (100 ft)	302.600
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$131.27
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	61.09
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	60.11
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.63
Steelmaking Scrap, GT	37.83	37.00	36.67	32.00	53.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Aug. 2 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$62.25
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	57.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$35.50	$30.50	$55.50
No. 1 Heavy Melt, E. Pa.	40.00	39.00	39.00	34.00	54.00
No. 1 Heavy Melt, Chicago	38.00	36.50	35.50	31.50	50.00
No. 1 Heavy Melt, Valley	38.50	38.50	38.50	33.50	59.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	35.50	31.50	56.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	44.50
Rails, Rerolling, Chicago	58.50	58.50	58.50	52.50	73.50
No. 1 Cast, Chicago	42.50	41.50	41.50	42.50	49.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Aug. 2, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 105; footnotes, page 107.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.San Francisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 .122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 .....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2...6.50
Sterling,Ill.(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2....5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W. Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 ..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14 ..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa., S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron

Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES

Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ...6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 .....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon

LosAngeles P2, S30...11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025

Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ...6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.H'rb'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ...5.85
Warren,O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ...8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ...8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ...7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 ....9.20
FranklinPark,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Con. S15 .7.875
NewCastle,Pa. B4, M23 7.425
NewHaven,Conn. D2...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8 7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 .....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ...15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrel,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ...7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown U5 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.375*11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	...	9.375*11.20*	11.90*	13.05*	....
Mansfield,O. E6	....	9.375*11.70	12.40	13.55	14.65
Newport,Ky. A2	....	9.375 11.70*	12.40*	13.55*	14.65*
Niles,O. M21	....	9.375*11.70	12.40	13.55	....
Vandergrift,Pa. U5	....	9.375*11.70	12.40	13.55	14.65
Warren,O. R2	....	9.375*11.70	12.40	13.55	14.65
Zanesville,O. A10	....	.... 11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
Beech Bottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ..8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ...8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ...8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 ..12.65
KansasCity,Mo. U3 ...12.90
LosAngeles(2) B3 ....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 ....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 ....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. MS.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ..13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	.....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Evanston,Ill. M22	.....12.45
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	.....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
NewCastle,Pa. M23	....12.35
Palmer,Mass. W12	.....12.65
Pawtucket,R.I. N8	.....12.65
Philadelphia P24	.....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7, T6	.12.65

NAILS, Stock Sizes — **Col.**

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	..$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	..$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	.....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....9.02
Jacksonville,Fla. M8	...8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	.....9.02
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.20
Minnequa,Colo. C10	....8.02
Pittsburg,Calif. C11	....9.20
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.94
SparrowsPt.,Md. B2	.....8.88
Sterling,Ill.(37) N15	....8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....9.30
Jacksonville,Fla. M8	....9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	.....9.30
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.50
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.50
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	....10.26
SparrowsPt.,Md. B2	....9.16
Sterling,Ill.(37) N15	....9.16

Coil No. 6500 Industrial 100 lb coil

AlabamaCity,Ala. R2	..$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8	..9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....9.35
Jacksonville,Fla. M8	....9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	.....9.35
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.55
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.55
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	....10.31
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	....9.21

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	.....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	..17.85	19.65
Bartonville K4	...17.95	19.80
Chicago W13	....17.85	....
Cleveland A7	....17.85	....
Craw'sville M8	.17.95	19.80‡‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5	..18.10	....
Kokomo C16	...17.95	19.50†
Minnequa C10	.18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	.17.95	19.75§
St'ling(37) N15	..17.95	19.80
Waukegan A7	..17.85	19.40†
Worcester A7	....18.15	....

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	.....191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A1	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld	Galv.
Ala.City,Ala.	R2	9.00	9.55**
Aliquippa	J5	....8.65	9.325§
Atlanta(48)	A11	..9.00	9.75*
Bartonville(48)	K4	9.85	19.90
Buffalo	W12	....9.00	9.55†
Chicago	W13	....9.00	9.55**
Cleveland	A7	.....9.00	...
Crawfordsville	M8	9.10	9.80††
Donora,Pa.	A7	...9.00	9.55†
Duluth	A7	.....9.00	9.55†
Fairfield	T2	.....9.00	9.55
Houston(48)	S5	..9.25	9.80**
Jack'vill,Fla.	M8	9.10	9.80‡‡
Johnstown(48)	B2	9.00	9.675§
Joliet,Ill.	A7	.....9.00	9.55†
KansasCity(48)	S5	9.25	9.80**
Kokomo(48)	S16	..9.10	9.65†
LosAngeles	B3	..9.95	10.625§
Minnequa	C10	...9.25	9.80**
Monessen(48)	P7	..8.65	9.35§
Palmer,Mass.	W12	9.30	9.85†
Pitts.,Calif.	C11	..9.95	10.50†
Rankin,Pa.	A7	....9.00	9.55†
S.Chicago	R2	....9.00	9.55**
S.SanFran.	C10	..9.95	10.50**
Spar'wsPt.(48)	B2	9.10	9.775§
St'ling(37)(48)	N15	.9.10	9.80
Struthers,O.	Y1	..9.00	9.65‡
Worcester,Mass.	A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

Prices are in process of being revised upward and new schedule will be published as soon as available.

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes: for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ⅛ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
2¾	12	62.62	73.40	55.59
3	12			

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	..6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	...7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	.....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	...10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 13/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅛ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		⅝		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—5%	Plates—Carbon Base 10%	Plates—Carbon Base 15%	Plates—Carbon Base 20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base—Cold Rolled—10%	Strip, Carbon Base—Cold Rolled—Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.845
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrail, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅜ in., grains bulk, Luning, Nev., $46; ⅜ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill	(Per base box;
Products	100 lb base wt)
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	70.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.70	$5.60	$5.50	$5.80
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.65	5.70	5.60	5.50	5.80
Channels	5.75	5.80	5.70	5.60	5.90
Plates (basic bessemer)	5.45	5.50	5.40	5.30	5.60
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	5.95	6.00	5.90	5.80	6.10
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.35	7.40	7.30	7.20	7.50

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

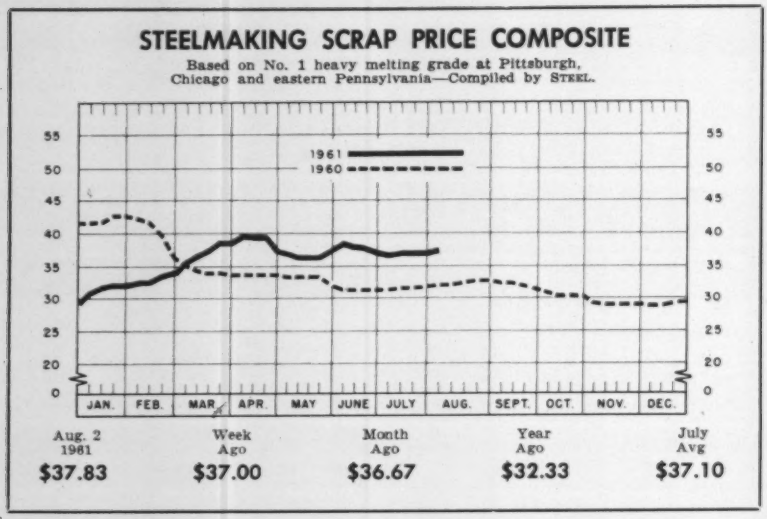
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.



Scrap Prices Rise on Light Sales

STEEL's index on No. 1 heavy melting grade advances 83 cents a ton to $37.83, a new high since June 21. Strength is attributed to light generation and good export demand

Scrap Prices, Page 114

● **Chicago** — Open hearth grades have advanced $1 to $2 a ton. The revisions were sparked by winning bids on 6000 tons of No. 1 factory bundles to be produced this month by an auto body stamper. At $39.91, on track, the bids were about $1.30 higher than those a month ago. With a $2.50 a ton switching charge, the mill delivered price would be about $42.50 without brokerage fee. Last sales had been at $42 a ton.

Another development bolstering the market was the announcement by a district mill that its buying price for No. 1 industrial heavy melting scrap returned by its customers would be $39.50 a ton, up $1.50 over the price a month ago.

Prospects for steelmaking during the next month or so do not support rising prices.

● **Philadelphia** — Scrap prices remain fairly strong here, with No. 1 heavy melting steel up $1 a ton to $40, delivered. Low phos structurals and plates are also up $1 for the second consecutive week to $44-$46.

District mills have inched up requirements. Export demand, while less pressing, is still taking a considerable tonnage. New Jersey pipe mills have covered on their major cast scrap requirements for August on the unchanged basis of $40, delivered, for No. 1 cupola.

● **New York** — Brokers' buying prices are unchanged. Except for an advance in low phos a week ago, there has been no change in prices for the active grades over the last few weeks. Borings and turnings remain weak and nominal.

● **Pittsburgh**—Although bids on No. 1 factory bundles from an automotive stamping plant were surprisingly high (up $3 a ton from last month's), the market is generally static. Brokers for a mill on the fringe of the district bought No. 1 heavy melting at a price equivalent to $36 a ton, delivered Pittsburgh. The same price was paid last month.

● **Youngstown** — A major district steel producer has placed an order for No. 1 heavy melting industrial scrap at $41 per gross ton, the same price it paid on a previous order and some $3 per ton over the nominal price for dealer scrap.

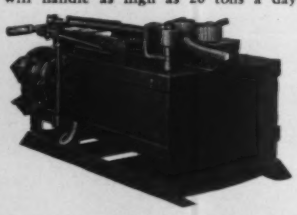
● **Buffalo**—District mills have announced they will do little buying of scrap for August delivery. The largest consumer indicates it will take nothing during the month, except for limited tonnages of turnings. Two smaller mills also will buy little because of the low steelmaking operating schedule.

Dealers had counted on some mill business in August and are disappointed. Consumer prices remain unchanged despite the lack of orders.

KARDONG CIRCLE BENDER

For Concrete Reinforcing Bars

This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radii on the same bar without stopping the machine.



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Model "C" Capacity 1¼ inch
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KARDONG BROTHERS, INC.
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EMOTIONAL FACTORS UNDERLYING INDUSTRIAL PURCHASES

A Motivational Research Study by Dr. F. Robert Shoaf for STEEL Magazine

This probing, depth-type study is available complete with conclusions and practical applications, attractively bound in 96-page hard cover form. Real, hard-hitting sales and advertising ideas based on the findings of one of the best and most widely acclaimed studies ever conducted in industrial marketing. Some of the topics discussed:

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PRICE $4.00 POSTPAID

STEEL, PROMOTION DEPT., 1213 W. 3rd ST., CLEVELAND 13, OHIO

Consumers are exerting no pressure for lower prices, although dealers are trying to buy for less.

Sales of cast scrap have been made recently at prevailing levels.

• **St. Louis**—The stronger tone in the scrap market continues. A slight rise in prices has started. Stove plate has moved up $1 a ton to $33; No. 1 railroad heavy melt, $1 to $36 a ton.

Scrap is pretty well in balance but not in oversupply. Some scrap is still moving to export via New Orleans. The volume of scrap business here is about normal.

• **Birmingham**—Dealers and brokers here believe the August price level, when it firms up, "will not be any lower than it was in July." One mill has held up shipments of some No. 1 bundles and No. 1 heavy melting steel scrap until later in the month.

• **Houston**—A generally stable market is expected this month. Mill inventories are high and shipments on current orders are moving well. Export demand is slow in Houston and sporadic in other Gulf ports. Mexican demand for Texas scrap is light. Over-all, the tapering demand is matched by the normally slow, seasonal intake. Cast iron prices are unchanged with the undertone weak due to slow sales.

• **San Francisco**—Brokers and dealers look for no major price change in the steel scrap market during August.

• **Los Angeles** — The light movement in scrap which featured July business is expected to continue through August. Although export demand has tapered, higher prices are quoted on top grades which are in short supply. That applies particularly to No. 1 heavy melting. Dealers are speculating on domestic prices, awaiting a resurgence of foundry and mill demand.

Iron Ore Statistics — June, 1961

(Gross tons)

	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign Ores	Total
At Furnace Yards						
Start of Month	25,883,022	3,336,919	1,240,799	2,903,380	16,898,293	50,262,413
End of Month in:						
Mass., N. Y.	2,144,808	23,864	59,009	171,184	299,171	2,698,036
Pennsylvania	5,860,793	399,541	21,563	71,003	8,025,000	14,377,900
Md., Va., W. Va.	511,665	7,479	.....	1,224,035	2,656,717	4,399,896
Ky., Tenn., Tex.	289,780	160,729	.....	181,617	76,646	708,772
Alabama	871	1,706,314	.....	108,025	3,639,181	5,454,391
Ohio	7,502,224	20,601	615,583	1,400,142	1,262,238	10,800,788
Indiana	6,018,408	28,579	343,098	45	52,680	6,442,810
Illinois	3,705,562	55,189	19,529	.....	216,783	3,997,063
Mich, Minn.	2,718,672	.....	243,669	22,853	283,549	3,268,743
Colo., Utah, Calif.	.....	856,378	.....	.....	10,991	867,369
Undistributed	445	2,346	.....	.....	554	3,345
End of Month Total	28,753,228	3,261,020	1,302,451	3,530,689	16,523,510	53,019,113
At U. S. Docks	2,652,751	.....	215,327	901,020	2,354,890	6,114,866
Total U. S.	31,405,979	3,261,020	1,517,778	4,431,709	18,878,400	59,133,979
In Canada	1,780,725	.....	78,451	254,066	63,626	2,161,864
Total U. S.-Canada	33,186,704	3,261,020	1,596,229	4,685,775	18,942,026	61,295,843

Consumption of Iron Ore—June, 1961

(Gross tons)

	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign Ores	Total
In U. S.						
Mass., N. Y.	396,417	26,352	21,601	11,589	39,165	495,124
Pennsylvania	794,473	277,989	2,282	49,982	651,071	1,775,797
Md., Va., W. Va.	120,804	14,682	.....	278,028	367,377	780,891
Ky., Tenn., Tex.	42,110	80,233	.....	55,216	29,619	207,178
Alabama	.....	346,843	.....	6,589	180,068	533,500
Ohio	1,079,291	5,919	57,534	106,810	136,309	1,385,863
Indiana	1,187,953	.....	104,209	979	15,779	1,308,920
Illinois	612,052	32,438	14,541	.....	35,327	649,358
Mich., Minn.	528,521	337	66,636	19,946	51,446	666,886
Colo., Utah, Calif	.....	659,166	.....	.....	1,029	696,195
Undistributed	115	51	.....	.....	89	255
In U. S.						
Blast furnaces	3,158,039	984,667	128,547	198,816	473,852	4,943,921
Steel furnaces	132,792	56,146	26,529	14,464	415,278	645,209
Sintering	1,470,829	439,197	111,727	315,859	618,149	2,955,761
Miscellaneous	76	.....	.....	.....	.....	76
Total U. S.	4,761,736	1,480,010	266,803	529,139	1,507,279	8,544,967
In Canada						
Blast furnaces	244,819	.....	15,285	96,829	4,495	341,428
Steel furnaces	.....	.....	.....	25,264	11,221	36,485
Sintering	93,176	.....	89,973	35,577	.....	216,726
Miscellaneous	.....	.....	.....	.....	.....	.....
Total Canada	317,995	.....	105,258	155,670	15,716	594,639
Total U. S.-Canada	5,079,731	1,480,010	372,061	684,809	1,522,995	9,139,606

Data from the American Iron Ore Association.

Scrap Exports Set Record

Exports of scrap soared to an all-time monthly high in May (959,000 gross tons), reports the Institute of Scrap Iron & Steel, Washington. It pushed the tonnage for the first five months to 3,480,000 tons compared with 2,270,000 tons for the like 1960 period. The increase is attributed to low prices on domestic scrap and the availability of considerable amounts of the most popular export grades.

Continued interest in export trade

U. S. GOV'T SURPLUS

STEEL FOUNDRY

Located in San Francisco Bay Area Industrial tract between Pittsburg and Antioch, California
Formerly Pacific Ordnance Steel Foundry

SEALED BID OPENING SEPTEMBER 13, 1961 (3:00 P. M. PDT)

★ Ready to operate Steel Foundry consisting of 31-Foundry, Utility and Admistrative buildings on approximately 41.146 acres. Buildings and equipment maintained in a "ready status." ★ Strategically located in rich, Pittsburg-Antioch Industrial Area and adjacent to existing Columbia-Geneva Steel Mill, Shell Chemical Co., U. S. Steel, Linde Air Products, Pacific Gas & Electric, etc. ★ 50 minutes from San Francisco-Oakland Bay Area with easy access via State routes #24 and #4. Proposed freeway will link area with Oakland within a few years. ★ Adequate existing residential area housing industrial workers nearby . . . new residential sub-divisions developing rapidly. ★ Served by Santa Fe Railroad spur track. Located near shipping channels. ★ Attractive Financing.

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SINCE 1873

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Aug. 2, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 2	$37.83
July 26	37.00
July Avg.	37.10
Aug. 1960	32.33
Aug. 1956	57.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	23.00-24.00
No. 1 busheling	35.00-36.00
No. 1 factory bundles	*46.00-47.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	42.00-43.00
3 ft and under	39.00-40.00
Heavy turnings	27.00-28.00
Punching & plate scrap	43.00-44.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	45.00-46.00
Angles, splice bars	44.00-45.00
Railroad specialties	45.00-46.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*39.00-40.00*
No. 1 hvy melt., dealer	*36.00-37.00*
No. 2 hvy melting	*31.00-32.00*
No. 1 factory bundles	*42.00-43.00*
No. 1 dealer bundles	*38.00-39.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling, indus.	*39.00-40.00*
No. 1 busheling, dealer	*36.00-37.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	43.00-44.00
Punchings & plate scrap	44.00-45.00

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	33.00-34.00
Clean auto cast	*47.00-48.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	56.00-57.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	63.50-64.50

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	*41.00-42.00*
Low phos. punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	44.00-45.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	39.00-40.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	41.00-42.00
Electric furnace bundles	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*20.50-21.50*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	*13.50*
Shovel turnings	*16.00*

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	*33.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00*
Rails, random lengths	39.00
Rails, rerolling	55.00
Rails, 18 in. and under	44.00†
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	*40.00*
No. 2 heavy melting	35.00
No. 1 bundles	43.00
No. 2 bundles	24.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*44.00-46.00*
Couplers, springs, wheels	44.00-45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	37.50-38.50
No. 2 heavy melting	29.00-30.00
No. 1 bundles	37.50-38.50
No. 2 bundles	21.00-22.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	41.00-42.00
Angles, splice bars	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
Machine shop turnings	10.00-11.00
Low phos. plate & structurals:	
3 ft	38.00-39.00
2 ft and under	43.00-44.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	*40.00-41.00*
No. 1 hvy melt (export)	*42.00-44.00*
No. 2 heavy melting	*37.00-39.00*
No. 2 hvy. melt (export)	*41.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*26.00-28.00*
No. 2 bundles (export)	*28.00-30.00*
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Electric furnace scrap	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-45.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	30.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

is reflected in 778,000 tons licensed for export during June.

Purchased scrap consumption by domestic mills in May was estimated at 2,214,000 tons, the highest total since March and the fourth straight month in which consumption increased. Daily use was 71,400 tons in May, well above April's rate of 65,500 tons and March's 59,800.

The proportions of scrap and pig iron used in May's total charge showed a pronounced change from those of the previous eight months. In May, the amounts were equal vs. 52 to 48 per cent ratio, in favor of scrap, during the earlier period.

Steel mill stocks of home and purchased scrap continued to decline steadily from the high of 11 months ago. The total was 6,093,000 tons at the end of May, down from the revised total of 6,413,000 tons at the end of April.

Wire . . .

Wire Prices, Pages 106 & 107

Wire mill bookings are slightly heavier for early delivery, but forward buying remains slow. Little tonnage for fourth quarter delivery is being entered.

Shipment on numerous industrial grades is not as prompt as might be expected. Producers are reluctant to schedule production for short runs that would increase costs.

Spring wire inquiry is starting to perk up. Depot Quartermaster, Richmond, Va., closes Aug. 14 on 850,000 helical springs.

Steel Bars . . .

Bar Prices, Page 104

Bar consumers are not buying for inventory, but orders for prompt shipment and current consumption are up slightly. Hot rolled carbon bars are being offered for delivery within two to four weeks.

Cold rolled carbon bars are moving a trifle better with shipment readily available on standard sizes. F. J. Robbins, president, Bliss & Laughlin Inc., Harvey, Ill., made this comment about cold finished bars: "Our customers, being a bit more optimistic, are buying more in their standard pattern. Because of auto model changeovers and summer vacations, we expect a moderate drop in . . . August production, but believe September and the balance of the year will show an appreciable upturn."

Hot and cold finished alloy bar business is more active than it was, but substantial gains will hinge on buying by automotive industry.

In New England, stocks of most users are low and will continue that way until deliveries begin to lengthen. Small arms account for most of the larger orders. Jones & Laughlin Steel Corp., Pittsburgh, booked 289 tons of 1 23/32 in. squares, hot rolled alloy, Grade 8620H gun quality, for the Springfield, Mass., Arsenal.

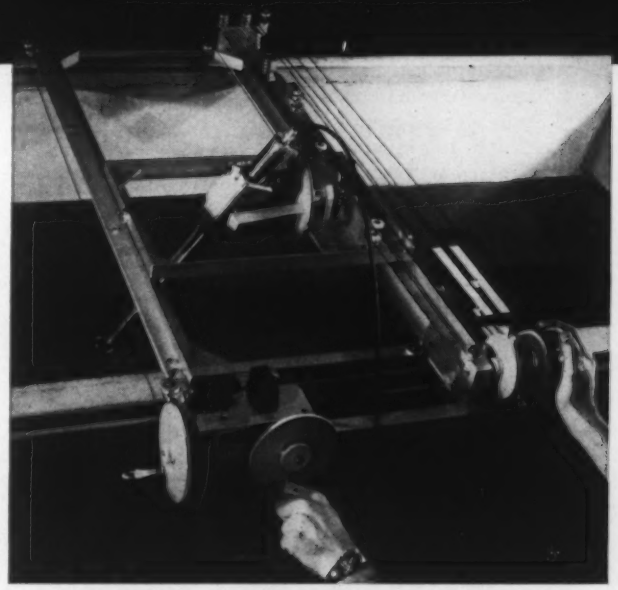
Pig Iron . . .

Pig Iron Prices, Page 109

American Motors Corp. closed its foundry at Kenosha, Wis., "pending a study of our future foundry approaches. As we move increasingly to new techniques in both aluminum and iron engine production, we want flexibility," the firm said. Lacking a foundry facility within the company, American Motors will have to obtain castings for its 1962 models from outside suppliers.

SCANNING BRIDGE

The Robot hands for ultrasonic flaw detection!



This "tailor-made" scanning bridge is used with the SONORAY® flaw detector. It holds the transducer in the required position and also permits its adjustment. The transducer may be raised or lowered, tilted in 2 planes or moved to any position in the tank.

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The scanning bridge is merely one of many outstanding examples of BRANSON ingenuity. This bridge was designed with the customer in mind! It was well-engineered at the lowest possible cost. The next time you have a problem, call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

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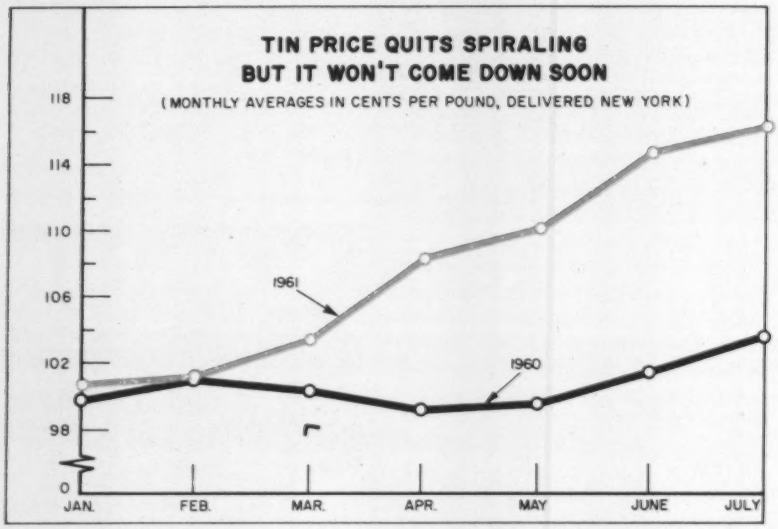
Time Coming for Decisions on Tin

Nonferrous Metal Prices, Pages 118 & 119

DESPITE its outward calm, the tin market is jumpy. The frenzied activity of buyers and sellers has eased. But underneath are strong pressures that may force early decisions on two important questions: 1. Should the U. S. dispose of some of its strategic stockpile of tin to ease the supply and price pressures? 2. Should the U. S. join the International Tin Agreement (ITA)? Outside the Red Bloc countries, we're the only major nation that doesn't belong.

Major consumers are worried by the excess of demand over supply that seems to be shaping up, despite some statements that have been made for public consumption. They don't like what has happened to the tin price. (It has climbed from $1 a pound early in the year to $1.17.)



Compiled by STEEL.

• **Asking Stockpile Release**—A quiet move is underway to get government to release some of the tin held in the national stockpile. A letter from the American Iron & Steel Institute to Commerce Secretary Hodges reads in part: "We suggest early consideration by the Department of Commerce of steps to initiate the Congressional and Presidential action necessary to facilitate prompt and orderly release of strategic stockpile tin if or when requested. Even if such action is started at an early date, several months will likely be required before decisions are reached."

Two factors are of significance in the AISI letter: First is the seriousness with which the steel industry views a possible future tin shortage. Second is the wide ranging effect a favorable reaction by the government could have. Here's why: A tin disposal program would mark the first time any metal in the strategic stockpile has been released to the public. It's no secret that many commodities in the stockpile are in excess of revised defense requirements and that some highly placed officials would like nothing better than to trim the surpluses.

• **Huge Stocks** — The law makes provision for disposal upon the approval of the administration (the Commerce, Interior, State, Agriculture, and Defense Departments) and of the Congress. The amount of tin in the strategic stockpile is classified, but educated guesses indicate there is enough metal to satisfy U. S. needs for six to eight years. The release of modest tonnages would stablize prices (at lower than the current level) and insure users of an adequate supply, reason consumers.

Stockpile disposal would probably be more difficult than the wording of the law indicates. One hint is the dillydallying that has taken place in the sale of the 3933 tons of metal in a special General Services Administration stockpile. It was acquired when the government's Texas City, Tex., smelter was sold several years ago. No special legislation is required for its disposal. Consumers and some producers have been pressuring the government to release this metal to the market, and both State and Commerce Departments have given the green light for its disposal, but only 500 tons have been released. The remainder is still at Warren, Ohio.

• **Poll on ITA**—Late last month, a group representing the steel companies, canners, traders, and smelters met with administration officials at the Commerce Department. Most of the conversation centered on whether the U. S. should join the International Tin Agreement. In an informed poll, the delegates voted this way: Eight said "No." Five said "No position." Four said "No comment." One said "Yes." There's even a division of opinion within some companies. The government hasn't stated an official position, though some insiders believe it favors membership.

The ITA is an organization of governments set up to stabilize tin prices and production. U. S. membership wouldn't require special legislation. It would be by multilateral treaty and require ratification by the Senate, as does any other treaty.

That's where the rub comes in, say opponents. Membership would give the ITA a voice in any disposal of U. S. tin stocks and possibly other internal matters involving the metal. Proponents say that membership would make it virtually impossible for a rumor to disrupt the world market, that speculative activity

would be severely limited, and that it would show our good faith toward underdeveloped nations that are major producers.

• **The Crux**—One thing is certain: The tin market has undergone a basic change which has brought problems. The job is to find the answers. Perhaps an upcoming meeting at the Commerce Department will point the direction.

U. S. Beryllium Corp. Increasing Ore Production

U. S. Beryllium Corp., Pueblo, Colo., has stepped up ore production to meet growing industrial demand. The company is daily supplying 1 ton of 8 per cent and higher beryllium oxide (BeO) content ores to the Loveland, Colo., mill of Mineral Concentrates & Chemical Co. (Mincon), Denver. This is preliminary to a full expansion program that will be underway in September.

In addition to the shipments of high grade beryllium ores, the company is continuing its program of stockpiling middle and low grade beryllium ores. They are for Mincon's concentrating plant being constructed on Badger Flats, west of Pikes Peak, Colo. The plant is designed for a daily capacity of 100 tons.

The concentrating plant will utilize an inexpensive water flotation process which can upgrade U. S. Beryllium's ores to as high as 33 per cent BeO content.

Tubular Goods . . .

Tubular Goods Prices, Page 108

An automated tube mill with a monthly capacity of more than 2 million ft of welded tubing is being installed at the Union, N. J., plant of Shapeweld Div., Solar Steel Corp. It is scheduled to begin operations Aug. 15. Capable of continuous operation by use of looping equipment, the Yoder mill can produce 50,000 ft of tubing per shift in diameters to 2.5 in. and wall thicknesses up to 0.093 in.

Seamless pipe business is good, but other pipe business is not holding up, says a sales executive at Youngstown Sheet & Tube Co., Youngstown. Similar reports are re-

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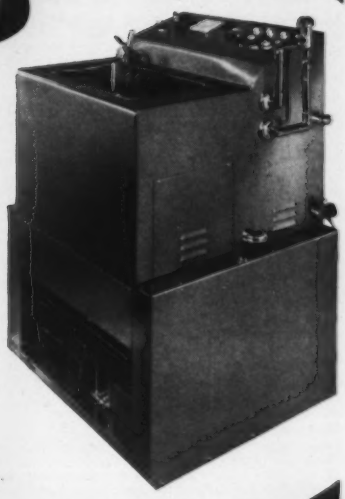

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75 deld.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pigs, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 116.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.30
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	...	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.75-23.25; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	56.13b	50.36–51.36	....	57.32
Yellow Brass	49.27	35.77c	49.56	53.43
Low Brass, 80%	52.15	52.09	52.44	56.21
Red Brass, 85%	53.17	53.11	53.46	57.23
Com. Bronze, 90%	54.73	54.67	55.02	58.54
Manganese Bronze	57.69	51.27	61.54	....
Muntz Metal	51.94	47.25	....	....
Naval Brass	53.94	47.75	60.25	58.10
Silicon Bronze	61.39	60.58	60.68	79.80
Nickel Silver, 10%	65.56	67.16	66.91	....
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90

SCRAP ALLOWANCES d (Based on copper at 31.00c)

Clean Heavy	Rod Ends	Clean Turnings
27.00	27.00	26.25
20.375	19.50c	18.50c
22.875	22.625	22.125
23.875	23.625	23.125
24.75	24.50	24.00
19.25	19.00	18.50
19.125	18.875	18.375
19.00	18.75	18.25
26.50	26.25	25.75
26.00	25.75	13.00
28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clipping, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.25; No. 2 heavy copper and wire, 26.00; light copper, 23.75; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.00; light copper, 23.75; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 19.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 135.50; 200-499 lb, 134.00; 500-999 lb, 133.50; 1000 lb or more, 133.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.90; 100-600 lb, 77.20; 700-1900 lb, 74.50; 2000-9900 lb, 72.60; 10,000 lb or more, 71.30.

Stannous Chloride (Anhydrous): 100 lb, 145.40; 400 lb, 135.40; 800-19,900 lb, 114.10; 20,000 lb or more, 109.90.

Stannous Sulphate: Less than 50 lb, 152.80; 50 lb, 122.80; 100-1900 lb, 120.80; 2000 lb or more, 118.80.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

ceived from other leading producers.

U. S.-Canadian oil drilling climbed to a new high for the year in the week ended July 24. Hughes Tool Co., Houston, reports 1998 rotary rigs at work in the two countries. The count is up 20 wells from the previous week. Gains in Texas and Oklahoma helped boost the total.

New orders for about 400 miles of 12 in. line pipe for oil pipelines have been announced by Page-Hersey Tubes Ltd., Toronto, Ont. The orders have been received from Western Pacific Products & Crude Oil Pipe Lines Ltd., Vancouver, B. C.; Peace River Oil Pipe Co. Ltd., Calgary, Alta.; and Interprovincial Pipe Line Co., Toronto, Ont.

Epps Industries Inc., Los Angeles, has placed a second welded steel tube mill (McKay) in operation. It handles diameters ranging $\frac{3}{8}$ to 2.5 in.

Armco Enlarges Facilities At Houston Plate Mill

Early this fall, Sheffield Div., Armco Steel Corp., will start operating its production line at the Houston plant for heat treating high strength, alloy steel plates up to 144 in. wide. The continuous plate hardening-quenching-tempering line will substantially augment the plant's equipment for heat treating round bars and 76 in. wide plates of high strength alloy steel.

The new heat treating production equipment has also been designed to handle the wider and heavier plates which will be rolled in the Houston plant's new, 160 in., slab-and-plate mill which will be completed next year.

With this and other installations at the Houston plant, Sheffield will be capable of producing heat treated, carbon and alloy steel plates ranging from 0.25 to 4 in. in thickness and up to 10 tons in weight.

"We will be able to produce heat treated, alloy plates in finished sizes up to 144 in. wide, 2 in. thick, and 45 ft long, at a maximum rate of 18 tons an hour," says K. P. Campbell, works manager, Houston plant.

Plates . . .

Plate Prices, Page 104

Plate demand is still drifting. Specialties are moving well, but sheared and universal plate specifications lag. Deliveries of universal plates range ten days to two weeks (in a few cases, three weeks).

Alan Wood Steel Co., Conshohocken, Pa., will end production on its 84 in. plate mill Aug. 10 and will start rolling on its new 110 in. mill Aug. 28. It will roll plates up to 4 in. thick—$\frac{3}{4}$ in was the limit of the mill it is replacing.

Plate shops in New England are estimating slightly heavier subcontract volume, mostly for shipyard. Weldment tonnage is showing signs of improvement, but mill orders are slack. Small tank volume is holding somewhat above earlier expectations, notably government installations. High tensile alloy shipments range five weeks and under.

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One Verson Straight Side Press—#HS2—250 ton—54 x 36 "T" double crank action single gear single drive high speed press. Stroke 6"—strokes per minute through vari-drive 50 to 100; automatic lubrication system; pneumatic die cushion. Three years old, like new. **Reply Box 953, STEEL, Penton Bldg., Cleveland 13, Ohio.**

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Positions Wanted

METALLURGICAL ENGINEER—M.S. Degree, age 35. Eleven years experience in laboratory and production. Desires responsible position in ferrous production or development. Resume on request. Reply Box 954, STEEL, Penton Bldg., Cleveland 13, Ohio.

FACTORY SUPERINTENDENT - MANAGER — Fully familiar with all phases of sheet metal and plate products manufacturing—methods welding, tools, dies, plant layout. Maintenance, labor relations—costs on both job shop and mass produced items—water heaters—metal furniture—also chemical and other process equipment—all metals. Reply Box No. 951, STEEL, Penton Bldg., Cleveland 13, Ohio.

Metal Can Shipments Rise

Metal can shipments during the first five months of this year showed a 2.8 per cent increase over the comparable 1960 period, reports the Can Manufacturers Institute, New York. During the five month period, 37,690 tons of steel were consumed for cans for soft drinks, 55.9 per cent more than a year ago. Shipments of cans for vegetables and vegetable juices during the period registered a 19.9 per cent increase over 1960.

Shipments of aluminum cans reached 15,628 tons during the five month period, 90.9 per cent more than a year ago. Shipments of cans for pressure packed products increased 8.2 per cent.

Steel Product Imports Exceed Exports in May

Imports of steel products exceeded exports by almost 100,000 tons in May. Imports totaled 280,982 tons (265,653, steel mill products; 15,239, other steel products) compared with 290,921 tons in the like month a year ago, reports the American Iron & Steel Institute. Total imports for the first five months came to 1,079,735 tons compared with 2,108,096 tons for the like 1960 period.

Imports of iron products and ferroalloys amounted to 37,353 tons in May, 1961, and 25,884 tons in May, 1960. This brought the total for the first five months to 118,917 tons this year against 132,874 tons a year ago.

Leading import items on a tonnage basis in May were: Concrete reinforcing bars (58,106), wire rods (37,347), welded steel pipe and tubing (36,845), plain structural shapes, 3 in. and over (25,670), wire nails (21,885), and bar shapes, under 3 in. (21,403).

Steel products exports in May totaled 183,599 tons (158,660, steel mill products; 24,939, other steel products) compared with 239,301 tons in May, 1960. Total exports in the first five months came to 840,004 tons this year compared with 1,191,054 tons a year ago.

Exports of iron products and ferroalloys amounted to 45,526 tons in May of this year, 14,010 tons in May, 1960, and 233,983 tons in the first five months of this year aaginst 62,874 tons in the like period a year ago.

Principal items exported in May included: Unfabricated structural shapes (18,979 tons), hot dipped and electrolytic tin plate (17,170 tons), tin plate, seconds (17,005 tons), and cold rolled sheets (14,564 tons).

Shipments of Steel Products—May, 1961

(Net tons)

Products	Carbon	Alloy	Stainless	First Five Months 1961	First Five Months 1960
Ingots	10,727	8,540	260	90,445	186,333
Blooms, etc.	66,566	35,283	2,420	417,797	793,429
Tube Rounds	1,641	458	.....	7,001	10,158
Skelp	5,793	.....	.....	51,937	76,765
Wire Rods	82,558	2,180	561	345,738	499,855
Structurals	389,441	3,033	8	1,689,044	2,546,060
Steel Piling	44,121	.....	.....	136,805	188,381
Plates	447,109	37,351	3,549	2,207,903	3,394,047
Rails—Standard	43,955	.....	.....	199,566	438,588
Rails—Other	3,058	.....	.....	20,432	23,460
Joint Bars	2,132	.....	.....	7,767	16,148
Tie Plates	10,970	.....	.....	37,049	71,578
Track Spikes	3,844	.....	.....	14,762	25,676
Wheels	16,382	133	.....	70,379	124,263
Axles	3,537	48	.....	22,737	62,032
Bars—Hot Rolled	447,769	120,834	3,837	2,353,351	3,826,399
Bars—Reinforcing	220,111	.....	.....	928,328	827,075
Bars—Cold Finished	83,352	16,289	5,137	446,127	777,686
Tool Steel	516	5,789	.....	30,720	45,917
Standard Pipe	185,288	310	.....	800,258	1,072,876
Oil Country Goods	95,530	23,680	.....	547,698	672,753
Line Pipe	255,662	479	.....	962,441	1,271,425
Mechanical Tubing	45,372	16,131	310	253,945	420,964
Pressure Tubing	18,856	3,884	1,313	105,613	122,366
Drawn Wire	225,013	2,909	1,994	926,450	1,180,642
Nails & Staples	33,227	.....	.....	140,557	153,941
Barbed Wire	9,360	.....	.....	37,234	23,325
Woven Fence	15,981	.....	.....	68,396	58,386
Bale Ties, etc.	12,806	.....	.....	30,833	28,366
Black Plate	48,872	.....	.....	220,912	282,653
Tin Plate—HD	27,845	.....	.....	123,903	174,536
Tin Plate—Electro	532,200	.....	.....	2,354,463	2,416,774
Sheets—HR	638,267	17,925	1,296	2,600,079	4,366,105
Sheets—CR	1,109,892	3,686	12,193	4,468,011	7,381,995
Sheets—Galvanized	297,124	.....	.....	1,201,021	1,525,706
Sheets—Other	19,799	.....	.....	81,996	130,030
Elec. Sheets—Strip	1,996	45,570	.....	214,704	299,478
Strip—H.R.	105,626	1,813	496	426,128	713,467
Strip—CR	88,972	1,266	15,456	456,603	711,916
Total (1961)	5,651,270	347,591	48,830	25,099,133	.....
Total (1960)	5,880,884	344,183	47,365	.....	36,941,554

Data from American Iron & Steel Institute.

Ford Boosting Foundry Capacity 10 Per Cent

Installation of three new cupolas (90 ft high) at Ford Motor Co.'s foundry in Brook Park (Cleveland), Ohio, will increase melting capacity of the plant by 10 per cent and substantially reduce production costs, says E. E. Harkess, plant manager.

The new cupolas replace six older units as part of a modernization program, which includes a recently completed air pollution control system. Two of the cupolas have been assembled, and the third will be in operation this month.

Hourly capacity of the new cupolas will be about 35 tons of iron melt compared with a 30 ton rate for the older ones. Preparation time for melting will be less than with refractory lined cupolas. In addition, melts will be more uniform, and cupola tenders will be able to exercise more precise control. Each of the new cupolas will have its own hot blast unit, a key to greater operational efficiency, says Mr. Harkess.

Structural Shapes . . .

Structural Shape Prices, Page 104

Buying of structural steel by the construction industry is disappointing. The volume of work up for figuring is substantial, but fabricators are not booking orders at the rate they did a few weeks ago. Fabricated steel prices continue to be weak. Labor disturbances continue to hurt construction in the New York metropolitan area.

In New England, tonnage of unplaced, but estimated, fabricated structural steel is backing up. That may cause late completion dates, although most of the volume is wide flanged and stringer work. Shopwork on it is limited. Builders are bearing down hard on steel prices in place. Unplaced tonnage of H-bearing piles is unusually heavy.

The $75 million Madison Square

Garden Center over the Pennsylvania Station in New York will require 25,000 to 30,000 tons of structural steel. The Garden can be converted into what is claimed to be the largest convention hall in the world. Describing the major sports arena, the architect, Charles Luckman, says it will be "the first use of a compression ring in such a large structure—an architectural structural system formed by steel cables embedded in concrete." It will provide an unobstructed view from all 25,000 seats.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons, Pennsylvania Avenue interchange, Washington, to Atlas Machine & Iron Works, Arlington, Va.

315 tons, addition No. 5, Armstrong Cork Co., Lancaster, Pa., to A. B. Lote Co., that city.

160 tons, state bridge work, Venango-Mercer-Crawford Counties, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

25,000 to 30,000 tons, $75 million Madison Square Garden Center over Pennsylvania Station, New York; structural bids to be asked in six to eight months; project to be completed in 1964. A heavy tonnage of reinforcing steel will also be required; a joint venture, Graham-Paige Corp., owner of present Madison Square Garden, will have 75 per cent interest and the Pennsylvania Railroad 25 per cent; Charles Luckman Associates, architects.

In addition to a major sports arena, seating 25,000, and an auxiliary arena seating 4000, the project will include a 34-story commercial building (the first 12 stories to provide parking space for 3000 cars); and a 28-story, 750 room hotel, which will be of concrete construction; the office building will require about 15,000 tons of structural steel.

15,000 tons, Beacon-Newburgh bridge superstructure, New York State Bridge Authority, Newburgh, N. Y.; Bethlehem Steel Co., Bethlehem, Pa., low bidder.

4800 tons, Roosevelt Bridge, Washington; McCloskey & Co., Philadelphia, low on general contract.

1281 tons, state education building, Trenton, N. J.; Keystone Structural Steel Co., that city, low bidder.

969 tons, state bridge work, Cumberland County, Pennsylvania; bids Aug. 25.

310 tons, Hy-80 light sections, Navy Purchasing Office, Washington; bids Aug. 14.

REINFORCING BARS . . .

REINFORCING BARS PENDING

3000 tons, spillway structure, Big Bend Reservoir project; bids Oct. 10, U. S. Engineer, Omaha, Nebr.

785 tons, yards and docks, Purchasing Div., Navy, Port Hueneme, Calif.; bids Aug. 17.

600 tons, state bridge work, Cumberland County, Pennsylvania; bids Aug. 25.

333 tons, bridge and drainage structures, Interstate Route 84 and East Hartford, Conn., highway; bids Aug. 14, Hartford, Conn.

RAILS, CARS . . .

RAILROAD CARS PLACED

Southern Railways, 200 boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Southern Pacific, 100, piggyback flatcars, to General American Transportation Corp., Chicago, and 50 flatcars, to the Johnstown, Pa., plant of Bethlehem Steel Co., Bethlehem, Pa., and 25 baggage cars, to Pacific Car & Foundry Co., Renton, Wash.

Trailer Train, 69, trailer flatcars, to Johnstown, Pa., plant of Bethlehem Steel Co., Bethlehem, Pa.

Canadian National, 40, seventy ton, steel covered hopper cars, 25, double deck flatcars, and 10, aluminum covered tank cars, to the Montreal Locomotive Works, Montreal, Que.

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Coming

Aug. 14

IN

STEEL

Reliability:

Profit

Cornerstone

Spending for reliability is an investment for profit growth. Check STEEL next week for the tools and techniques that will help you set up a profitable reliability program.

This will be the sixteenth installment in a 25-part series that will run for the rest of the year. For a free copy of any or all articles in the program (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Local Business Scores Again! On this, our Twentieth Anniversary, we salute the energy and foresight of thousands of businessmen and executives in every part of the land for their continuing support of the Payroll Savings Plan for U.S. Savings Bonds. For twenty years, they have seen the Payroll Savings Plan pay off in more local buying power. They've seen it help create more efficient and confident employees. They've seen it as a hard-to-beat employee benefit program. They've seen it improve labor relations and cut employee turnover. They've seen it strengthen the economic sinews of the nation.

How about you? Why not install this plan now or learn the many ways to improve participation in your existing plan. Send for complete brochure. Call your State Savings Bonds Director or write: U.S. Savings Bonds Division, Treasury Department, Washington 25, D.C.

20th ANNIVERSARY 1941 ☆ 1961

U.S. SAVINGS BONDS
20 Years of Service to America

STEEL

The U. S. Government does not pay for this advertisement. The Treasury Department thanks, for their patriotism, The Advertising Council and the donor.

FIRST ALL-NEW FACILITY FOR THIN TIN PLATE

Wean will build cleaning line for Weirton Steel's expansion

Weirton Steel Division of National Steel Corporation will expand its supply of thin tin plate product for the container market by 300%—marking the first installation of processing equipment specifically designed to treat thin tin plate. The new, high-speed Wean line incorporated in this expansion will clean, chemically treat and oil the light-weight tin plate, which can be shipped to container manufacturers at reduced shipping charges and lower initial cost.

Weirton Steel will be able to handle 60,000 lb. coils on this new line, processing the thin tin plate at speeds up to 2200 fpm. Other features of the line include precision tension control, balanced rolls, and rigid design to assure uniform strip tracking.

This pioneer installation designed specifically for thin tin plate is only one example of Wean's experience in this field. Over 80% of the world's supply of *all* tin plate is produced on Wean equipment—as is the thin tin plate processed by eight of the nine current producers. This unique background of engineering "know-how" can help you in planning your requirements.

THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

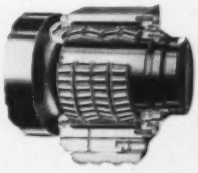
WEAN

Bearing down on costs in BLAW-KNOX hot strip mill

When Blaw-Knox built this 56-inch semi-continuous hot strip mill, they wanted to be sure it would roll silicon, high alloy, carbon and stainless steels at the lowest possible operating cost per ton. They made sure by mounting back-up rolls on modern Timken® tapered roller bearings. Operating cost savings have been proved by actual case studies on hot strip mills in the steel industry. Timken bearings use low cost grease lubrication. Modern Timken balanced proportioned bearings in back-up roll positions on new mills are being designed to provide: 1) 10% roll turn down, 2) Roll neck diameters which are 70% of the minimum roll barrel diameter, 3) Normal roll neck stresses of 8,500 pounds per square inch.

Timken back-up roll bearings eliminate costly mill downtime due to damaged bearings and failure of the lubrication system. Because they virtually eliminate friction, mills start up easier, bearings and rolls last longer. For the most in bearing performance and engineering service when you buy or build a mill, specify Timken bearings.

The Timken Roller Bearing Company, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.



Industry rolls on

TIMKEN®

tapered roller bearings